

EXHIBIT 1

ALEXANDROS SPILIOTOPOULOS, PH.D.

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF NORTH CAROLINA
SOUTHERN DIVISION
NO. 7:23-CV-897

IN RE:)
CAMP LEJEUNE WATER LITIGATION)
This Document Relates to:)
ALL CASES)
_____)

VIDEOTAPED DEPOSITION OF

ALEXANDROS SPILIOTOPOULOS, PH.D.,

a witness herein, called by the Plaintiffs for
examination, taken by and before Ann Medis, RPR, CLR,
CSR-WA, and Notary Public in and for the Commonwealth
of Pennsylvania, via Zoom Videoconference, at the
offices of Department of Justice Civil Litigation 1100
L Street NW, Washington, DC 20005, on Tuesday,
March 18, 2025, commencing at 9:22 a.m.

GOLKOW TECHNOLOGIES

ALEXANDROS SPILIOTOPOULOS, PH.D.

1 A P P E A R A N C E S

2 On behalf of Plaintiff

3 WEITZ & LUXENBERG, P.C.
4 BY: LAURA J. BAUGHMAN, ESQUIRE
DEVIN BOLTON, ESQUIRE
700 Broadway
5 New York, New York 10003
212.558.5915
6 lbaughman@weitzlux.com
dbolton@weitzlux.com
7

8 On behalf of Defendant United States of America

9 U.S. DEPARTMENT OF JUSTICE
10 BY: HAROON ANWAR, ESQUIRE
KAILEY SILVERSTEIN, ESQUIRE
GIOVANNI ANTONUCCI, ESQUIRE
11 1100 L Street NW
Washington, DC 20005
12 202.552.9843
haroonanwar@usdog.gov
13

14 Also present via Zoom

15 Jeff Davis
Allison O'Leary
16 Deanna Havai
Leonard Konikow
17 Morris Maslia
Remy Hannet
18

19 April Carter, videographer
20
21
22
23
24
25

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ALEXANDROS SPILIOTOPOULOS, PH.D.

1 P R O C E E D I N G S

2 - - - -

3 THE VIDEOGRAPHER: We are now on the
4 record. My name is April Carter. I'm a
5 videographer for Golkow. Today's date is
6 March 18, 2025, and the time is 9:22 a.m. This
7 video deposition is being held at 1100 L Street
8 Northwest, Washington, D.C. 20005, in the matter
9 of In Re: Camp LeJeune Water Contamination, for
10 the Court of the Eastern District of North
11 Carolina. The deponent is Alexandros
12 Spilotopoulos.

13 Will counsel please identify themselves,
14 in-person counsel please identify themselves for
15 the record.

16 MS. BAUGHMAN: Laura Baughman from Weitz
17 & Luxenberg for the plaintiffs.

18 MS. BOLTON: Devin Bolton for the
19 plaintiffs.

20 MR. ANWAR: Haroon Anwar for the United
21 States.

22 MR. ANTONUCCI: Giovanni Antonucci for
23 the United States.

24 MS. SILVERSTEIN: Kailey Silverstein for
25 the United States.

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1 THE VIDEOGRAPHER: Thank you. Will the
2 court reporter please swear in the witness.

3 ALEXANDROS SPILIOTOPOULOS, PH.D.,
4 having been first duly sworn, was examined
5 and testified as follows:

6 EXAMINATION

7 BY MS. BAUGHMAN:

8 Q. Please state your name.

9 A. Alexandros Spilotopoulos.

10 Q. Do you go by Dr. Spilotopoulos?

11 A. Sure.

12 Q. Dr. Spilotopoulos, my name is Laura
13 Baughman. I'm an attorney, and I represent the
14 plaintiffs in the plaintiffs and the plaintiff
15 leadership group in this case.

16 Do you understand that?

17 A. Yes.

18 Q. Do you understand that you're under oath
19 today?

20 A. Yes.

21 Q. And that your testimony is the same as
22 if you were in court before the judge?

23 A. Yes.

24 Q. If you don't understand any question I
25 ask you today, will you please let me know?

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1 A. Yes.

2 Q. Otherwise, if you answer a question, I'm
3 going to assume that you understood it. Is that
4 fair?

5 A. Yes.

6 Q. We are going to take breaks today
7 usually once every hour, hour and a half, but if
8 you need a break at any time, just let me know,
9 and we'll take a break. Okay? The only thing I'd
10 is that you answer the question that I've asked
11 you before we take a break. Okay?

12 A. Yes.

13 Q. Is there any reason you cannot testify
14 fully and truthfully today?

15 A. No.

16 Q. For example, you're not on any
17 medications or have any health issues?

18 A. No.

19 Q. Have you ever served as an expert in a
20 litigation before?

21 A. I have not.

22 Q. You have not?

23 A. I have not.

24 Q. Prior to this case, had you ever
25 prepared an expert report for litigation?

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1 A. I have contributed work as far as
2 supporting expert reports, but I have not prepared
3 one by myself.

4 Q. So you helped other people write their
5 reports; is that fair?

6 A. That is correct.

7 Q. But you didn't sign off on them?

8 A. No.

9 Q. Have you ever testified in a deposition
10 before?

11 A. No. This is the first time.

12 Q. Have you ever testified at a trial
13 before?

14 A. No.

15 Q. Or before Congress?

16 A. No.

17 Q. Or in any other capacity under oath?

18 A. No.

19 Q. What did you do to prepare for the
20 deposition today?

21 A. I briefly reviewed my expert report and
22 I had a meeting with the lawyers yesterday, too,
23 in the office here.

24 Q. Just one meeting to prepare?

25 A. For today, yes.

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1 Q. How long was that?

2 A. Some part of the day, but not the entire
3 day yesterday.

4 Q. Like four or five hours?

5 A. Something like that.

6 Q. Did anyone attend other than lawyers and
7 yourself?

8 A. No.

9 Q. Did you review documents to prepare?

10 A. I looked at Chapter A of the two
11 reports, I believe. The chapter -- the
12 contaminant transport chapter for Taraway Terrace.
13 I believe that's what I looked at very quickly on
14 a couple of things.

15 Q. Other than looking at those documents
16 and your report and talking to the lawyers, did
17 you do anything else to prepare for today's
18 deposition?

19 A. No.

20 Q. Did you speak with anyone other than the
21 attorneys to prepare for today's deposition?

22 A. No.

23 (Spiliotopoulos Exhibit 1 was marked.)

24 BY MS. BAUGHMAN:

25 Q. I'm going to hand you -- I've handed you

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1 what the court reporter has marked as Exhibit 1 to
2 your deposition.

3 And is that a true and accurate copy of
4 your current CV?

5 (There was a discussion off the record.)

6 MR. ANWAR: Let's go off the record for
7 one minute.

8 THE VIDEOGRAPHER: Off the record at
9 9:28.

10 (Recess from 9:28 a.m. to 9:37 a.m.)

11 THE VIDEOGRAPHER: On the record at
12 9:37.

13 BY QUESTIONER:

14 Q. Dr. Spilotopoulos, before the technical
15 issues we just had, I handed you what we've marked
16 as Exhibit 1 to your deposition. And my question
17 is: Is that a true and accurate copy of your
18 current CV?

19 A. I'll be happy to answer the question. I
20 just wanted for a second to go back to my
21 previous. You asked me how I prepared for this.

22 Q. Yes.

23 A. I just wanted to make sure that I
24 provide a complete answer. Yesterday I met with
25 the lawyers for a few hours. A few weeks ago I

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1 had met with them again on a number of things, and
2 we went over some -- the process of the deposition
3 as well. So I don't know if that counts as
4 preparation, but I just wanted to make sure that
5 it's on the record.

6 Q. So you had two meetings with the lawyers
7 to prepare?

8 A. Yes.

9 Q. About how many hours did you spend
10 preparing for the deposition?

11 A. A few hours as well I would say, but
12 that included other things that were discussed at
13 the same time.

14 Q. I mean total if you added them all
15 together.

16 A. Seven, eight hours maybe total.

17 Q. So let's go back to Exhibit 1. Is
18 Exhibit 1 a true and accurate copy of your current
19 CV?

20 A. Well, it looks right as far as I can
21 recall from the last time I put it together as
22 part of the expert report that I produced.

23 Q. Right. To be clear, what I marked as
24 Exhibit 1 is the version of the CV that was
25 attached to your expert report in this case. So

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1 when you attached that, that was the true,
2 accurate, current CV; correct?

3 A. Yes.

4 Q. And you don't have anything to add
5 today; true?

6 A. No. I don't think so, no.

7 Q. So you have a Ph.D. from the University
8 of Vermont from 1999; correct?

9 A. Yes. I have my bachelor's in civil
10 engineering from the University of Patras in
11 Greece focusing on hydraulics and hydrology. I
12 also did a thesis on groundwater flow at the time.

13 And then I completed Ph.D. at University
14 of Vermont '94 to '99 under the advisorship of
15 Dr. George Pinder on the optimization of
16 groundwater management problems, looking at
17 groundwater modeling and optimization techniques.

18 Q. So Dr. George Pinder was your advisor
19 for your Ph.D.?

20 A. That is correct. And I had a
21 co-advisor, Dr. George Karatzas at the University
22 of Vermont.

23 Q. So do you consider Dr. Pinder to be an
24 expert in the area of groundwater modeling?

25 A. Yes. Actually, Dr. Pinder is one of the

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1 pioneers in the field of groundwater modeling.

2 Q. Likely also in -- let me start over.

3 Do you also consider Dr. Pinder to be an
4 expert in hydrogeology?

5 A. Yes.

6 Q. I think I know the answer to this, but
7 what's your opinion of Dr. Pinder? Is he
8 respected in the fields of groundwater modeling
9 and hydrogeology?

10 A. He's very well respected in the field.

11 Q. Do you consider him to be authoritative
12 in the field?

13 MR. ANWAR: Object to form.

14 THE WITNESS: I consider him an expert,
15 yes.

16 BY MS. BAUGHMAN:

17 Q. Do you consider yourself to be an expert
18 in hydrogeology?

19 A. I do.

20 Q. On your CV, Exhibit 1, it says on the
21 first page Example Areas of Expertise. And you've
22 listed four of those; right?

23 A. Yes, as general fields of expertise,
24 yes.

25 Q. And those are fields that you consider

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1 yourself to be an expert in; fair?

2 A. I have expertise and experience in these
3 fields, yes.

4 Q. Including groundwater modeling?

5 A. Yes, I do.

6 Q. Do you have any other areas of expertise
7 to add other than hydrogeology, groundwater
8 modeling, and the other three categories on your
9 CV?

10 A. No. These areas I described as
11 generally cover the areas of expertise that I
12 have.

13 Q. Are you a licensed professional
14 engineer?

15 A. No, I'm not.

16 Q. So there's an exam that you can take to
17 get your PE or professional engineering license;
18 correct?

19 A. That is true.

20 Q. And you didn't pursue that?

21 A. I have not.

22 Q. Are you a licensed geologist?

23 A. No.

24 Q. Do you hold any professional licenses?

25 A. As a civil and environmental engineer

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1 from Greece, yes, at the time that I worked there
2 as a professional engineer.

3 Q. So you have a license from Greece?

4 A. Yes.

5 Q. Is that current?

6 A. No. I haven't kept it up I moved to the
7 United States in 2004.

8 Q. So since 2004, have you held any
9 professional licenses?

10 A. No, I have not.

11 Q. Do you hold any professional
12 certifications?

13 A. No.

14 Q. Now, on your CV, you list -- under
15 Professional Societies on the first page there in
16 the right-hand column, there's two societies, the
17 National Groundwater Association and the American
18 Geophysical Union; right.

19 A. That is correct.

20 Q. Have you held any offices in those
21 societies?

22 A. No. I'm just a member of those
23 societies.

24 Q. Regarding the American Geophysical
25 Union, are you a fellow of that organization?

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1 A. No, I am not.

2 Q. Do you know, what does it mean to be a
3 fellow of the American Geophysical Union?

4 A. It's a distinction I believe, but I
5 don't know the details of what it entails.

6 Q. It's an honor; right?

7 MR. ANWAR: Object to form.

8 THE WITNESS: Possibly I'm not sure what
9 exactly it entails. I understand that it's some
10 kind of distinction.

11 BY MS. BAUGHMAN:

12 Q. Had you ever tried to pursue becoming a
13 fellow?

14 A. No, I have not.

15 Q. Are you aware if Dr. Konikow is a fellow
16 of the American Geophysical Union?

17 A. Possibly. I'm not sure. It is
18 possible, if I recall correctly, but I'm not sure.

19 Q. Have you ever met Dr. Konikow?

20 A. I have.

21 Q. In what context?

22 A. At least twice socially, a friend's
23 house. I don't recall that I had another personal
24 encounter with him other than I believe when I saw
25 him at the expert panel meeting in 2005 in

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1 Atlanta.

2 Q. Did you speak to him at that panel
3 meeting?

4 A. No, I did not. I did not know him
5 personally at the time.

6 Q. Have you ever worked with Dr. Konikow?

7 A. No, I have not.

8 Q. And Dr. Konikow is well respected in the
9 fields of groundwater hydrogeology and
10 hydrogeology. Fair?

11 A. Yes.

12 Q. Like Dr. Pinder, he's considered one of
13 the pioneers in the field. Do you agree?

14 MR. ANWAR: Object to form.

15 THE WITNESS: I don't know that I can
16 make a comparison like that. I'll just yes, he's
17 a respected member of the scientific community in
18 our field.

19 BY MS. BAUGHMAN:

20 Q. You just mentioned the expert review
21 panel. I'm going to ask you some questions about
22 that. But you're referring to is the 2005 expert
23 peer-review panel for the ATSDR modeling work
24 we're here to talk about today; correct?

25 A. The expert panel that was held in

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1 Atlanta in 2005.

2 Q. Which was about the ATSDR's modeling
3 work that your report is the subject of; correct?

4 A. That we're discussing, yes, the
5 groundwater modeling that was ultimately developed
6 by ATSDR.

7 Q. Dr. Konikow, he was an invited member on
8 the peer-review panel for that meeting; correct?

9 A. Yes. Dr. Konikow was a member of that
10 panel.

11 Q. You weren't part of the expert panel;
12 right?

13 A. I was not.

14 Q. Have you ever served on an expert
15 peer-review panel?

16 A. I have not.

17 Q. Have you been invited to serve on an
18 expert peer-review panel?

19 A. I have not.

20 Q. Have you ever received any professional
21 awards for your work?

22 A. You have to define the type of awards
23 you're talking about.

24 Q. Any award.

25 A. I have had recognitions for work that I

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1 had done as part of my undergraduate work and
2 presentations that I gave then. I have awards or
3 recognitions on presentations that I have done at
4 different conferences. I believe some of that may
5 be in my résumé.

6 Q. So talking about since you've been a
7 professional, after school, which awards have you
8 received?

9 A. Best paper presentation in a conference.

10 Q. Anything else?

11 A. Not that I can recall.

12 Q. How many times did you receive an award
13 for a presentation at a conference?

14 A. I'm trying to remember if it was once or
15 twice.

16 Q. And to the extent you received that,
17 it's reflected on your CV; is that true?

18 A. I do not recall if I have it included
19 there. I have to check.

20 Q. What year did you receive that award or
21 awards?

22 A. That's a good question. It was a few
23 years ago. I believe it was waste management
24 conference, if I remember correctly.

25 Q. Do you know which paper it was?

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1 A. No. I don't recall which paper it was
2 about.

3 Q. Was it like 10 years ago, 15?

4 A. Within the last 10 years maybe,
5 something like that, but I'm not sure. I have to
6 check.

7 Q. Do you know if it was once or more than
8 once that you received such an award?

9 A. I'm sure once. There might be another
10 one, but I don't recall.

11 Q. And you can't identify which paper?

12 A. Not off the top of my head.

13 Q. You've listed your papers in your CV,
14 right, that you've presented at conferences?

15 A. Yes.

16 Q. Can you look at the CV and tell me which
17 paper or papers you got an award for?

18 A. The 2019 paper, superior paper and
19 papers of note. 2019 Spilotopoulos, DiFilippo,
20 Khambhbhammettu, Web-Assisted Methods And tools,
21 et cetera, et cetera.

22 And there's a paper that I presented
23 back in 2007 on the analysis of aquifer test data
24 and that presentation was part of the MODFLOW and
25 More 2006 conference in Colorado, which was

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1 included in the book by Sterrett in Groundwater
2 and Wells, the 3rd edition.

3 Q. And you received an award for that as
4 well?

5 A. That was not an award. It was just
6 included in a book. It was some kind of
7 recognition award that was done.

8 Q. You're saying your paper was included in
9 a book, but you didn't receive an award for that
10 paper; fair?

11 A. Fair.

12 Q. So any other awards you can tell us
13 about that you received in your professional
14 career?

15 A. Not that I can think of at this moment.

16 Q. Was your paper, the paper that you just
17 referenced, was it included in the book or just
18 cited in the book?

19 A. I think it was included in an appendix
20 in a book or it's an electronic version. I do not
21 recall.

22 Q. Can you tell us under oath whether that
23 paper was actually included in the book?

24 MR. ANWAR: Object to form.

25 THE WITNESS: I'm not sure I remember in

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1 what form it was included there, but it was
2 referenced -- I can't recall if it was included in
3 the appendix or described in the appendix, but
4 there was a clear reference to that work.

5 BY MS. BAUGHMAN:

6 Q. So it might be just a reference?

7 A. I will have to look at more detail and
8 give you a complete answer on this.

9 Q. Are you a member of the National Academy
10 of Engineering?

11 A. I am not.

12 Q. Have you served on the editorial board
13 for any professional publication?

14 A. I have not.

15 Q. So, for example, you haven't been the
16 editor and chief of any publication?

17 A. I have not.

18 Q. Have you been a reviewer for any
19 professional publications?

20 A. I have not.

21 Q. Have you ever been asked to be a
22 reviewer for any professional publication?

23 A. There have been discussions as to
24 whether that could be done. I don't have an
25 official indication or I have not done it.

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ALEXANDROS SPILIOTOPOULOS, PH.D.

1 Q. So you haven't been officially invited
2 to be an reviewer for any publication; is that
3 true?

4 A. That is true.

5 Q. You've listed your publications on your
6 CV on pages 4 and 5; right?

7 A. Yes.

8 Q. Is what's listed on Exhibit 1, pages 4
9 and 5, is that a complete list of your
10 professional publications?

11 A. Yes.

12 Q. It definitely includes all your
13 publications within the last 10 years. Truth?

14 A. Yes.

15 Q. Have you ever published anything about
16 Camp LeJeune?

17 A. I have not.

18 Q. Which of your publications concern the
19 modeling the fate and transport of contaminants in
20 groundwater?

21 A. You want me to list them one by one
22 based on what's in the CV?

23 Q. First of all, all of the publications on
24 your CV, are they all peer reviewed?

25 A. Not all of them.

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1 Q. So, for example, the ones that you
2 present at conferences, do you consider those
3 peer-reviewed publications?

4 A. They are reviewed so they can be
5 accepted, yes, many of them.

6 Q. So you consider conference presentations
7 to be peer reviewed?

8 A. I would think so, yes.

9 Q. Did you get comments and edits back on
10 your papers before you were able to present it at
11 the conference?

12 A. Yes.

13 Q. And is that the normal protocol for
14 conferences?

15 MR. ANWAR: Object to form.

16 THE WITNESS: Not always.

17 BY MS. BAUGHMAN:

18 Q. So, I mean, you have here maybe 10, 15
19 papers, because some of these listed under the
20 publications and presentations are just
21 presentations; right?

22 A. It's a mix.

23 Q. Go ahead and -- is it fair to say you
24 really only have two publications that are in
25 peer-reviewed journals?

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1 A. Yes.

2 Q. And of those two, did they concern
3 modeling the fate and transport of contaminants in
4 groundwater?

5 A. At least one of them directly and the
6 other one, forms and shapes of doing this kind of
7 work, tools for doing that, yes.

8 Q. So you have one publication that
9 directly concerns modeling the fate and transport
10 of contaminants in groundwater and one that
11 concerns that indirectly; true?

12 A. Or tools to perform that analysis, yes.

13 Q. That's the sum total of your
14 peer-reviewed publications on modeling fate and
15 transport contaminants in groundwater; right?

16 A. Yes.

17 Q. Have you presented at any conference
18 about Camp LeJeune?

19 A. I have not.

20 Q. And have you presented at any conference
21 regarding the modeling of fate and transport of
22 contaminants in groundwater?

23 A. I'm sorry. Can you repeat? I'm trying
24 to say if it's relevant to Camp LeJeune what you
25 just asked. Can you repeat the question, please?

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1 Q. I'm asking a more general question, not
2 just about Camp LeJeune.

3 Have you done presentations regarding
4 the modeling of fate and transport of contaminants
5 in groundwater?

6 A. Several, yes.

7 Q. Which ones concern that?

8 A. The first one just happened last week.

9 Q. Wait. So for the record, you're talking
10 about the March 12, 2025 presentation on an
11 integrated approach for developing contaminant
12 upwelling estimates?

13 A. Correct. The second one, Remedy
14 Challenges, Novel Approaches and Lessons Learned.

15 Q. Okay. By the way, are those first
16 two -- those were given within the last week or
17 so -- are those -- were there papers associated
18 with those presentations?

19 A. Yes. They're included in the
20 proceedings.

21 Q. Are those available now online?

22 A. I'm not sure that the proceedings are
23 already produced.

24 Q. Go ahead and continue. Which of your?

25 A. Number four, Web Assisted Methods and

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1 tools for Efficient Remedy Design.

2 Q. Okay.

3 THE WITNESS:

4 Number 5, Evaluating environmental
5 remediation Performance. Well, that one is
6 primarily with a aggression analysis. So
7 statistics, but it involves to some extent
8 modeling as well.

9 BY MS. BAUGHMAN:

10 Q. By the way, I'm not talking about just
11 modeling. Let's be clear. There's groundwater
12 flow modeling, right, and then there's modeling of
13 the fate and transport of contaminants. So I'm
14 asking about the fate and transport of
15 contaminants. So you're saying --

16 A. That as well is part of that work, yes.
17 Implementation of a Contaminant Treatment System,
18 MT3D.

19 Q. The one from 2011?

20 A. Yes.

21 Q. Modified 2D Field Generator for
22 Deterministic and Stochastic Groundwater Modeling.
23 That includes contaminant transport
24 considerations.

25 Shannon, Spilotopoulos and Tonkin, 2011,

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ALEXANDROS SPILIOTOPOULOS, PH.D.

1 Estimating Contaminant Migration Pathways.

2 Particle tracking is part of the fate and

3 transport evaluations.

4 Remediation of the 100-HR-3 Operable

5 Unit, Hanford, Washington, 2011.

6 Groundwater Modeling in Support of

7 Remedial Process Optimization, 2010.

8 2008, Robust Pump and Treat Remedy

9 Evaluation for MTBE Mega-Plume.

10 2008, Rapid Mapping to Support

11 Accelerated Site Assessments.

12 The Multi-period Approach to the

13 Solution -- that's the paper in the peer-reviewed

14 publication.

15 Q. That's a journal. That's not a

16 conference proceeding; right?

17 A. Yes.

18 Q. And then the Biconcave-Decomposition

19 Method For The optimal Design of Pump-and-Treat

20 Remediation Systems, 2000.

21 And even back in '98, the development of

22 two optimization models multi-period, et cetera.

23 Q. That's a complete list?

24 A. Yes.

25 Q. I want to ask you -- if you go to page 3

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ALEXANDROS SPILIOTOPOULOS, PH.D.

1 of your CV, you list on the top right-hand side a
2 confidential client that you did some work for.

3 Can you tell me who that client was?

4 A. I cannot.

5 Q. Why not?

6 A. Because it's confidential. I have a
7 confidentiality agreement.

8 Q. What about on page 4. You've got
9 another confidential client from El Campo, Texas.
10 Can you tell me who that is?

11 A. No, for exactly the same reason.

12 Q. Well, the El Campo, Texas work concerned
13 modeling groundwater flow and contaminant
14 transport using MODFLOW, right, and MT3?

15 A. MT3D and ATRANS.

16 Q. So can you identify who you did that
17 work for?

18 A. I cannot. It's a client that at least
19 at the time when I did it, there was a
20 confidentiality agreement. I don't think that has
21 changed since then.

22 Q. So you're going to refuse to answer the
23 question?

24 A. I don't think I can answer the question
25 because of the confidentiality clause.

GOLKOW TECHNOLOGIES

ALEXANDROS SPILIOTOPOULOS, PH.D.

1 Q. The work that you did at El Campo, was
2 that historical reconstruction?

3 A. That's a very long time ago to remember
4 the details of that work.

5 Q. Do you know?

6 A. I do not recall the details of that
7 project.

8 Q. It says on your CV that you constructed,
9 calibrated and deployed numerical and
10 semi-analytic methods or simulating groundwater
11 flow and contaminant transport to estimate the
12 contaminant release history at the site based on a
13 recent monitoring data; right?

14 A. Yes, that is correct.

15 Q. So the work was to go back in time to
16 determine what happened in the past; right?

17 MR. ANWAR: Object to form.

18 THE WITNESS: Generally speaking, yes.
19 I just don't recall the details of what it
20 entailed.

21 BY MS. BAUGHMAN:

22 Q. So you can't tell us how you helped this
23 confidential client determine what had been
24 released in the past at that site?

25 A. Not off the top of my head right now.

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ALEXANDROS SPILIOTOPOULOS, PH.D.

1 It's been a very long time since I did that work.

2 Q. You can't say what modeling method you
3 used to do that?

4 A. What do you mean by modeling method?

5 Q. Well, let's put it more generally. You
6 weren't modeling into the future, were you? You
7 weren't forecasting?

8 MR. ANWAR: Object to form.

9 THE WITNESS: No. I was not
10 forecasting.

11 BY MS. BAUGHMAN:

12 Q. You were --

13 A. Estimating the contaminant release
14 history at the site. At least that's the
15 description of the work that was done then. I'm
16 just saying that I do not recall the specifics of
17 the work at this moment.

18 Q. According to your CV, you used MODFLOW
19 and MT3DMS to try to determine what had been
20 released in the past; right?

21 A. I used the simulation software to
22 perform that work, yes.

23 Q. Which simulation software?

24 A. MODFLOW and MT3D.

25 Q. When you say MT3D, is that the same

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ALEXANDROS SPILIOTOPOULOS, PH.D.

1 thing as MT3DMS?

2 A. It's a variation of that.

3 Q. Is MT3D the precursor to MT3DMS?

4 A. It's a version -- MT3DMS is a version of
5 the code that's had some different capabilities on
6 doing certain dates, but they're very much the
7 same foundation of the code.

8 Q. Were you able to use these models that
9 you've identified, MODFLOW and MT3D, to determine
10 the historical releases that had occurred at the
11 El Campo site?

12 A. That's a very general question. Yes.
13 In looking back in time, that's very much what you
14 do most of the times. But the specifics I do not
15 recall.

16 Q. Since you received your Ph.D. in 1999,
17 you've worked at two different engineering
18 consulting companies; right?

19 A. Where do you mean?

20 Q. Well, On your CV you've listed ADK
21 Consulting Engineers and you listed S.S.
22 Papadopoulos & Associates.

23 Have you worked anywhere else since
24 getting your Ph.D.?

25 A. I have not.

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ALEXANDROS SPILIOTOPOULOS, PH.D.

1 Q. So for your entire professional career,
2 you've worked at either ADK Consulting or S.S.
3 Papadopoulos; right?

4 A. Correct.

5 Q. So ADK Consulting Engineers was in
6 Athens; correct?

7 A. Yes.

8 Q. And you were there from 2001 to 2004?

9 A. From 1999 to 2004 I was in Greece. 2001
10 I believe was the time when I became an employee,
11 full-time employee of ADK Consulting Engineers.
12 Between '99 and 2001, I was working part time for
13 them while I was serving in the Army in Greece.

14 Q. According to your LinkedIn profile, you
15 were a civil engineer in the hydraulics division.
16 Does that sound correct?

17 A. That is correct.

18 Q. And while you were at ADK, did you
19 develop or use groundwater flow models?

20 A. As part of my work at ADK, no.

21 Q. While you were the ADK, did you develop
22 or use any contaminant transport models?

23 A. I did not. For groundwater
24 contamination?

25 Q. For groundwater; right.

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ALEXANDROS SPILIOTOPOULOS, PH.D.

1 A. I did not.

2 Q. So then you started S.S. Papadopoulos in
3 2004; right?

4 A. Correct.

5 Q. You spent the majority of your career at
6 S.S. Papadopoulos; correct?

7 A. I spent all of my professional career so
8 far in the United States at Papadopoulos &
9 Associates.

10 Q. And according to is S.S. Papadopoulos'
11 website, it is an employee-owned groundwater and
12 environmental consulting firm. Does that sound
13 correct?

14 A. That sounds right.

15 Q. Do you have an equity stake in the
16 company?

17 A. You have to be more specific about that.
18 What do you mean?

19 Q. You have ownership in is S.S.
20 Papadopoulos?

21 A. Yes. I have ownership. I have some
22 ownership.

23 Q. Can you describe what that is? How does
24 that work?

25 A. I have a number of -- small number of

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ALEXANDROS SPILIOTOPOULOS, PH.D.

1 shares, and all employees, we have shares of the
2 company as well.

3 Q. Is it publicly owned?

4 A. It is not.

5 Q. Privately owned?

6 A. Private.

7 Q. And how is it that you get shares? Is
8 that based on rewards, performance, evaluations?

9 A. Internal evaluations and promotions and
10 contributions to the company.

11 Q. When was the last time you got a
12 promotion?

13 A. The most recent one would have been
14 maybe two years ago, three years ago.

15 Q. And are the -- is the award of shares in
16 the company based on how much money you bring into
17 the company?

18 A. I'm not the one to judge that, but my
19 understanding is that it's a combination of
20 project work, quality of the work, recognition of
21 the work within our client base and how that
22 contributes to the reputation of the company in
23 our field.

24 Q. Do you also receive bonuses based on
25 your performance?

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1 A. Everybody in the company does depending
2 on how well the company does on a year-by-year
3 basis.

4 Q. You have designed and used groundwater
5 models while you've been working at S.S.
6 Papadopoulos; right?

7 A. Yes, plenty.

8 Q. And you've used those models to evaluate
9 contaminant migration in groundwater; right?

10 A. Yes, that is correct.

11 Q. You've also used groundwater models to
12 design remediation systems?

13 A. That is correct.

14 Q. Have you used them for any other
15 purpose?

16 A. What do you mean by that?

17 Q. When you use a groundwater model, you're
18 using it to do something; right?

19 A. That's correct.

20 Q. I know you've used it to determine
21 different or to recommend different remedial
22 designs at groundwater sites, right, to clean up
23 the groundwater?

24 A. The modeling work that I have done in
25 terms of contaminant transport revolves around the

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1 presence and migration of contamination in an
2 aquifer. And then there are different things that
3 we look at, design a monitoring system, evaluate
4 the extent of contamination, design a remedy to
5 clean up the aquifer or contain the aquifer. So
6 there are different aspects to it.

7 Q. How does a flow and transport model help
8 you to design a remedial design, to come up with a
9 remedial design? How does that work?

10 A. Well, the process first involves the
11 collection of monitoring data that can help us
12 understand or get a quick understanding of what is
13 happening in the aquifer depending the project.
14 If we have a source water or if we have just a
15 dissolved plume, the groundwater model then
16 becomes a tool to try to approximate the
17 conditions in the aquifer so we can simulate the
18 plume migration, the extent of contamination. And
19 then if it's about the design of a remedial
20 system, determine where, for example, extraction
21 wells should be placed to extract contaminated
22 water or a combination of injection extraction
23 wells, let's say, if we're trying to contain
24 contamination. There are different objectives we
25 look at remedial systems.

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1 Q. So it's fair to say your models, your
2 groundwater modeling has been used to make
3 important decisions like on how to clean up
4 contaminated sites?

5 MR. ANWAR: Object to form.

6 THE WITNESS: The importance is
7 relative, but it is -- they are designed to be
8 used for making decisions, yes.

9 BY MS. BAUGHMAN:

10 Q. In your opinion, is groundwater modeling
11 a reliable methodology to estimate groundwater
12 flow?

13 MR. ANWAR: Object to form.

14 THE WITNESS: What do you mean by
15 reliable?

16 BY MS. BAUGHMAN:

17 Q. Something that you can recommend to your
18 clients that they can rely upon.

19 A. In our profession, we use different
20 methods and approaches to evaluate environmental
21 data or water level data, for example, anything
22 that goes into understanding groundwater flow and
23 contaminant transport in the aquifer. And we use
24 them in different ways to make these decisions.

25 Q. Is groundwater modeling a reliable

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1 methodology?

2 MR. ANWAR: Object to form.

3 THE WITNESS: Groundwater modeling is a
4 methodology that is used in helping us to make
5 decisions.

6 BY MS. BAUGHMAN:

7 Q. And you consider it reliable?

8 A. It by itself the methodology or approach
9 is not reliable. What makes it reliable is how
10 well constructed, for example, the model is to
11 perform this calculation.

12 Q. Is groundwater modeling a reliable
13 methodology to determine contaminant transport?

14 MR. ANWAR: Object to form.

15 THE WITNESS: Again, the methodology
16 itself is not reliable. There are tools that we
17 use. How they're implemented is what makes them
18 reliable.

19 (Spiliotopoulos Exhibit 2 was marked.)

20 BY MS. BAUGHMAN:

21 Q. Dr. Spilotopoulos, the court reporter
22 has handed you what we have marked as Exhibit 2 to
23 your deposition, which is the first chapter from
24 the book Applied Groundwater Modeling: Simulation
25 of Flow and Effective Transport, by Anderson and

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1 others. It's Second Edition from 2015.

2 This is a book that you cited repeatedly
3 in your expert report for this case; right?

4 A. That is correct.

5 Q. I just have a very general question
6 about it. If you turn to -- it's page 4. The
7 pages are at the top right-hand side. At the very
8 bottom of the page, Dr. Anderson and her
9 colleagues wrote, "To date groundwater models are
10 accepted as essential" --

11 A. I'm sorry. I'm not following you. Say
12 that again. Where is that?

13 Q. The very last line.

14 A. Yes. Okay.

15 Q. Dr. Anderson wrote, "Today groundwater
16 models are accepted as essential tools for
17 addressing groundwater problems."

18 Do you agree with that statement?

19 A. That is a very general statement, and I
20 agree.

21 Q. As I mentioned, this book Applied
22 Groundwater Modeling, you cited multiple times in
23 your report, didn't you?

24 A. I believe I had.

25 Q. Do you consider Applied Groundwater

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1 Modeling by Anderson and others to be a reliable
2 source in the area of groundwater modeling?

3 MR. ANWAR: Object to form.

4 THE WITNESS: I believe that is a very
5 good and useful book that has many good points
6 that are made there regarding how we construct,
7 calibrate and use -- evaluate and use a
8 groundwater model.

9 BY MS. BAUGHMAN:

10 Q. Now, you have used MODFLOW and MT3DMS
11 multiple times in your career; fair?

12 A. Yes.

13 Q. You've used MODFLOW to analyze
14 groundwater flow; right?

15 A. Yes.

16 Q. MODFLOW is a code that was created by
17 the U.S. Geological Survey in the 1980s; right?

18 A. There was a precursor to MODFLOW early
19 on, and then about sometime in the '80s, yes, I
20 think the first version was 1988, if I remember
21 correctly.

22 Q. MODFLOW --

23 A. In the '80s developed by the USGS, yes.

24 Q. Would you agree that the source code and
25 the underlying equations for MODFLOW have been

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1 tested extensively?

2 MR. ANWAR: Object to form.

3 THE WITNESS: Generally, yes, I agree,
4 although there have been corrections, additions,
5 extensions and things like that over time to make
6 it even more efficient.

7 BY MS. BAUGHMAN:

8 Q. And how many groundwater flow models
9 have you developed or used using MODFLOW
10 approximately?

11 A. It's hard to remember because they're
12 the ones that I have been directly been involved
13 as leading the work and there are many others that
14 I have participated in their development. So
15 there's tens of models.

16 Q. How many?

17 A. Tens, many tens.

18 Q. Using MODFLOW?

19 A. Among other codes of similar capacity.
20 But MODFLOW, yes, tens of times.

21 Q. You've used MT3DMS to model the fate and
22 transport of contaminants; right?

23 A. Yes.

24 Q. And the source code and the underlying
25 equations for MT3DMS have been extensively tested;

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1 true?

2 MR. ANWAR: Object to form.

3 THE WITNESS: The validity of the
4 calculations that MT3D performs, yes, they have
5 been tested and benchmarked.

6 BY MS. BAUGHMAN:

7 Q. About how many fate and transport models
8 have you developed or used using MT3DMS?

9 A. Tens of models as well.

10 Q. Would you agree that the use of MT3DMS
11 in combination with MODFLOW a generally accepted
12 and widely used methodology in your field?

13 MR. ANWAR: Object to form.

14 THE WITNESS: They're both widely used
15 tools in simulating groundwater flow and
16 contaminant transport in our field, yes.

17 BY MS. BAUGHMAN:

18 Q. And ATSDR used MODFLOW coupled with
19 MT3DMS to model groundwater flow and contaminant
20 transport at Camp LeJeune; right?

21 A. Yes.

22 Q. You agree that those were appropriate
23 models to use for that purpose?

24 MR. ANWAR: Object to form.

25 THE WITNESS: I believe I said before

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1 the tools themselves are tested and good to be
2 used for groundwater flow and contaminant
3 transport analysis. It's their construction,
4 calibration and evaluation of their uncertainty
5 that is critical on how they're used.

6 BY MS. BAUGHMAN:

7 Q. Obviously in your report, you have
8 multiple criticisms of how ATSDR used the models;
9 right?

10 A. That is correct.

11 Q. I want to start with this. You have no
12 criticism that ATSDR chose MODFLOW and MT3DMS as
13 tools to use for its groundwater modeling; is that
14 true?

15 A. I did not criticize the use of those
16 tools.

17 Q. Do you have any criticisms today of
18 ATSDR's choice to use MODFLOW and MT3DMS as models
19 for their modeling of groundwater flow and
20 contaminant transport?

21 A. My criticism is only on how those tools
22 were used to construct, calibrate and evaluate the
23 uncertainty analysis of these models to be used
24 for the calculations intended in the analysis.

25 Q. Your criticism is not on the choice of

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1 those models, fair?

2 A. On the tools. Let's be very careful.
3 I'm saying MT3D and MODFLOW are great tools to be
4 used in our field for these calculations. How
5 they're used is what's in question at times.

6 Q. And your criticisms of how ATSDR used
7 MODFLOW and MT3DMS, your standards on what they
8 should have been done and not done, would you
9 apply those same standards to the work that you do
10 for your clients?

11 A. Every situation is different. So you
12 can never compare two models side by side unless
13 they're exactly the same, they use the same data,
14 they use the same -- they have the same
15 objectives. Every time is different and has to be
16 judged on its own merit.

17 So the general standards about how well
18 one calibrates a model, for example, is something
19 that -- there's some general standards, but then
20 every situation is different. So you cannot apply
21 the same metric to two models.

22 Q. But there are very some standards on how
23 one should calibrate a model; fair?

24 A. I believe there are.

25 Q. You'd apply the same standards to your

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1 work as you'd apply to ATSDR; fair?

2 A. We have to look specifically at two
3 situations, and I think offer an opinion on that.

4 Q. Let me ask you this: In your field, are
5 there standards that are written about how to
6 calibrate a groundwater flow and fate and
7 transport model?

8 A. There are guidelines on how to construct
9 and calibrate a model, yes.

10 Q. Where are they? Can you identify them?

11 A. We have several standards like ASTM
12 standards. We have the USGS guidelines on
13 constructing the groundwater flow model. These
14 are the ones that I can think of, off the top of
15 my head. These standards, however, are generally
16 enough to provide a blanket statement as to how
17 things need to be done.

18 But, like I said, there are no specific
19 metrics that come with the standard that say, and
20 this is how it's done, you have to follow this
21 guideline, that guideline. But again, every
22 situation is different.

23 Q. What do you mean there are no specific
24 metrics?

25 A. Like what is a calibration standard.

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ALEXANDROS SPILIOTOPOULOS, PH.D.

1 Q. There's no specific calibration
2 standard?

3 A. There's no metric that says if you are
4 within that range, for example, you have a good
5 model; if you're in that range, you're not.

6 Q. And that's true in your field of
7 groundwater modeling and hydrogeology; correct?

8 A. I believe so, yes.

9 Q. In your CV, it says that you've used
10 in-house enhanced versions of MODFLOW and MT3DMS.

11 What does that mean that you have
12 enhanced versions, in-house enhanced versions?

13 A. At SSPA we have been using these codes
14 not as black box. In other words, we have experts
15 that have contributed to the development of these
16 codes. And since these codes are not proprietary
17 like other experts in the field, we can go into
18 the code and tweak it at times to do certain
19 things that maybe the code doesn't do it in the
20 way that is suitable for a particular problem.

21 In many cases, that becomes an
22 additional package, let's say, that people call
23 for using with MODFLOW. These are presented at
24 conferences, papers, and often they become
25 standard packages that are used in new versions of

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1 the code.

2 Q. So any of the enhanced versions of
3 MODFLOW and MT3DMS that are in-house, have those
4 been published?

5 A. An example that comes to mind is this --
6 I don't think I have the paper there -- where we
7 edited MT3D to allow for the recirculation of
8 water that comes out of a treatment plant, from
9 extraction wells, into the treatment plant, and
10 back to injection wells to make sure that we
11 properly simulate the recirculation of
12 contaminants in the aquifer. And that's a package
13 we developed first as an in-house tool to use for
14 our own calculation purposes. And later on that
15 also became a package and a tool that is now
16 available in the newer versions of MODFLOW and
17 MT3D.

18 Q. So it's been published in a journal?

19 A. Yes. And it's included also in the
20 instructions manual of the newer versions of the
21 code.

22 Q. Are all of the enhanced versions,
23 in-house enhanced versions of the MODFLOW and
24 MT3DM at SSPA, have they all been published and
25 peer reviewed?

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1 A. No.

2 Q. Would you characterize your in-house
3 enhanced versions of MODFLOW and MT3DMS as custom
4 methods?

5 A. Sometimes we have customized approaches,
6 yes. The work that that I have been involved in,
7 those customized methods have been documented,
8 benchmarked and they have also been published,
9 like the one I just mentioned.

10 Q. All of them have been published?

11 A. The ones that I can speak of.

12 Q. What do you mean the ones you can speak
13 of?

14 A. The ones that I've worked on, that I'm
15 familiar with.

16 Q. Does SSPA have any proprietary enhanced
17 versions of the groundwater models?

18 A. There was a time that a version of MT3D
19 was developed as proprietary, and I think for
20 sometime it was something that we were offering.
21 I'm not sure that that's the case anymore. It's a
22 very old version of the code anyway. It was
23 included in some modeling interfaces, for example,
24 as is a version of choice, of course, documented,
25 benchmarked and all that.

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1 I don't think we offer anything.

2 Everything we have as part of the software we
3 develop is always open source and available for
4 people to use.

5 Q. What do you mean benchmarked?

6 A. Benchmarking is the process where
7 analytical methods, equations and other forms of
8 performing a calculation are used to compare the
9 results of this modified version to those accepted
10 expressions of condition in the field and how we
11 calculate that condition to make sure that code
12 matches the results of the analytical solutions,
13 for example, making sure of their accuracy.

14 Q. What's the longest time, looking
15 forward, the longest time you've predicted
16 contaminant fate and transport using modeling?

17 A. You mean any on project I ever worked
18 on?

19 Q. Yes.

20 A. They're very different timeframes, from
21 a few years to many years.

22 Q. Many years, decades?

23 A. Yes. In some cases, yes. But, of
24 course, let's not forget that these calculations
25 all come with the necessary disclaimers regarding

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1 the uncertainty or what underlie these
2 calculations so it's always perfectly clear what
3 exactly they represent or what their intended
4 purpose is, by the way, which is equally
5 important.

6 Q. Have you used models to generate
7 concentrations in monthly time steps, meaning
8 concentrations of contaminants?

9 A. That has been part of calculations that
10 I've performed. But that was something that was
11 done in the past. There were some predictions at
12 times. Again, the framework of these calculations
13 is important.

14 Q. But you have predicted in the future
15 contaminant concentrations in monthly time steps;
16 right?

17 A. As a prediction?

18 Q. Yes.

19 A. Yes. And that was part of potential
20 plume migration as part of an analysis to give a
21 sense of what should be expected in a remediation
22 project so that decisions could be made on how
23 exactly to operate wells to contain that plume.

24 Q. Is that at the Hanford site?

25 A. That's an example of that, yes.

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1 Q. Have you done it at other sites?

2 A. I can't recall the time stepping of
3 predictions at other sites, but I have done
4 predictive modeling, yes, as part of remediation
5 projects to guide the remediation process and make
6 decisions on the design of the extraction wells,
7 for example, how much they need to pump, and then
8 use that information then to see how it compares
9 with data collected afterwards, see whether the
10 predictions are good enough or update them where
11 there is a disconnect between what the model
12 suggested and what the data indicated later on.

13 Q. Have you ever performed a historical
14 reconstruction or hind casting using groundwater
15 modeling?

16 A. Hind casting is a very general
17 description, term. We have developed models to
18 simulate conditions in the past and perform
19 calculations using those results, yes. But the
20 framework, again, is something that needs to be
21 discussed. Not every hind casting work is the
22 same.

23 Q. Which projects have you done hind
24 casting on?

25 A. Hanford work is behind casting. By that

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1 I mean that we went back in time and looked at the
2 conditions in the aquifer, plume migration in the
3 past. We have done that for Hanford. I've done
4 that for other projects, looking in the last 20,
5 25 years and migration of a plume in the aquifer,
6 looking at data that would inform and the model
7 construction and the model calibration.

8 Q. I want to ask you some more questions
9 about Dr. Pinder, your thesis advisor for your
10 Ph.D.

11 Are you aware that Dr. Pinder performed
12 hind casting for a model that was prepared for
13 litigation regarding PCE contamination?

14 A. I'm not sure which one you're referring
15 to.

16 Q. Are you aware that Dr. Pinder was the
17 plaintiff's expert in the Woburn case?

18 A. Yes.

19 Q. And he performed hind casting for
20 Woburn, didn't he?

21 A. He looked at, yes. He used groundwater
22 modeling to perform some calculations concerning
23 past conditions.

24 Q. And he did that in order to do a few
25 things. He did that in order to determine whether

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1 the PCE contamination could reach certain
2 groundwater wells; right?

3 A. I believe the issue in that case was to
4 determine whether certain wells were impacted by
5 one or another source.

6 Q. And also when they were impacted; right?

7 A. I'm not sure about that. I think the
8 main issue was which sources contributed to which
9 wells. I do not recall the specifics of when.

10 Q. We'll get to that in a minute. So you
11 agree that the case, the Woburn case, Woburn,
12 Massachusetts, it involved TCE contamination
13 wastes that had been dumped on the ground by
14 different industries?

15 A. That is right.

16 Q. Just to be clear, you did discuss the
17 Woburn case in your expert report in this case;
18 right?

19 A. I mentioned the general framework of
20 that with respect to how it compares to Camp
21 LeJeune.

22 Q. So the plaintiffs in the Woburn case
23 claim that they had developed cancer, that they
24 had developed leukemia from drinking contaminated
25 well water; right?

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1 A. Yes.

2 Q. By the way, did you work with Dr. Pinder
3 on the Woburn case?

4 A. No, I did not.

5 Q. Had that happened before you were there?

6 A. That happened before, yeah.

7 Q. Did you ever talk to Dr. Pinder about
8 Woburn?

9 A. There were very general discussions
10 about the Woburn case, but never a detailed one on
11 exactly how work was done.

12 Q. So did you ever review Dr. Pinder's
13 modeling work for Woburn?

14 A. No, I did not.

15 Q. Did he mention Woburn in his teaching?

16 A. Woburn was a very known case at the
17 time. There was a movie I think at the time as
18 well. But under the very general terms. We never
19 went into details as far as I can remember.

20 Q. But you learned how to do groundwater
21 modeling from Dr. Pinder; right?

22 A. Among others, yes.

23 Q. And did he teach hind casting or
24 historical reconstruction?

25 MR. ANWAR: Object to form.

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1 THE WITNESS: I'm not sure how to answer
2 that question. Part of the things that I learned
3 with him was how to construct the model, how to
4 calibrate a model and use it also as a management
5 tool.

6 BY MS. BAUGHMAN:

7 Q. Just to be clear, you're offering an
8 opinion in this case about the differences between
9 Woburn and Camp LeJeune; right? You've commented
10 on that in your report?

11 A. The comment that I made in my report --

12 Q. Try to answer my question. You are
13 comparing Woburn and Camp LeJeune in your report;
14 right?

15 A. In my report I'm offering a comparison
16 between the two with respect to the level of
17 detail and the kind of results that we're getting
18 from the ATSDR models in Camp LeJeune versus the
19 different approach or results that are produced by
20 the Woburn case model.

21 Q. Have you reviewed the Woburn case model?

22 A. I have not reviewed the model itself.

23 Q. Did you review Dr. Pinder's testimony in
24 that case?

25 A. No, I did not.

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1 Q. He was deposed for many days, and he
2 testified at trial. Did you review any of that
3 testimony?

4 A. No, I did not.

5 Q. Have you reviewed his expert report,
6 Dr. Pinder's report in Woburn?

7 A. No, I did not.

8 Q. Do you know whether Dr. Pinder used a
9 groundwater model to demonstrate that water
10 contaminated with PCE reached water wells in
11 Woburn?

12 MR. ANWAR: Object to form.

13 BY MS. BAUGHMAN:

14 Q. Do you know whether he did that?

15 A. He did determine or he offered an
16 opinion on which sources contributed contamination
17 to which wells.

18 Q. Using groundwater modeling?

19 A. That is correct.

20 Q. Are you aware that there was no sampling
21 data of groundwater or well water prior to 1979,
22 which was when the wells had been discovered to be
23 contaminated?

24 A. I do not recall the dates on when
25 monitoring data were available.

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1 Q. Well, let me just ask this. For
2 Dr. Pinder's work, did he have available to him
3 past groundwater and well water contamination
4 data?

5 MR. ANWAR: Object to form.

6 THE WITNESS: Again, I do not recall
7 when he had data available to construct his
8 models.

9 BY MS. BAUGHMAN:

10 Q. So for your opinion in this case in
11 comparing Woburn to Camp LeJeune, you don't know
12 how the amount of data compared, like what
13 Dr. Pinder had versus what ATSDR had; fair?

14 A. The comparison that I made was --

15 Q. I want you to answer my question. Can
16 you tell us the difference between the past, the
17 historical groundwater and well water
18 contamination data, how that compared, Camp
19 LeJeune versus Woburn?

20 MR. ANWAR: Object to form.

21 THE WITNESS: Again, I'm not sure that I
22 can do that, but that was not the opinion I
23 offered in my --

24 MR. ANWAR: Let him finish.

25 THE WITNESS: That is not the opinion

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1 that I offered in my expert report. Therefore,
2 that is somewhat irrelevant to what I said there
3 and the comparison I made.

4 BY MS. BAUGHMAN:

5 Q. That's your opinion. I'm going to ask
6 you questions about it. In 1979 it was discovered
7 that the Woburn wells, two of them, were
8 contaminated with PCE; correct?

9 A. That is possible. I do not recall the
10 details. So I cannot opine on an analysis that
11 was done for a different project with different
12 data that were not part of what I reviewed as part
13 of my opinions for this project.

14 Q. Can you tell me anything about the
15 amount of data Dr. Pinder had available to him in
16 terms of concentrations to do his modeling work in
17 Woburn?

18 A. I cannot do that today.

19 BY MS. BAUGHMAN:

20 MR. ANWAR: Laura, whenever you're at a
21 good place. We've been going for about an hour.

22 MS. BAUGHMAN: Let me try to get through
23 this.

24 BY MS. BAUGHMAN:

25 Q. What did you review about Woburn to

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1 offer your opinions about Woburn in this case?

2 A. Mr. Maslia offered a summary of the work
3 that was done in different studies that he
4 considered similar to the Camp LeJeune case. And
5 there, even from that summary, it was obvious and
6 again from additional opinions that Mr. Maslia has
7 offered over time, that the work at Camp LeJeune
8 was different from all of them and the fundamental
9 part that it was all novel, complex and the level
10 of detail in the results that it produced was
11 something unprecedented in that sense.

12 So there may similarities with other
13 work on certain aspects of the different studies
14 or projects. But this one was unique. And that
15 was the whole point of my opinion, that the
16 uniqueness of the modeling work done here cannot
17 be compared with the other studies.

18 The fact the Camp LeJeune models
19 calculate monthly concentrations at the treatment
20 plant is something that the other analysis that he
21 provided as examples did not do and for the
22 timeframe that that was done. So this is where my
23 critique is primarily based on.

24 MS. BAUGHMAN: I'm going to object to
25 that answer as nonresponsive.

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1 BY MS. BAUGHMAN:

2 Q. The question I asked you, which I'll ask
3 you again, what materials did you review about
4 Woburn to offer an opinion about how Woburn
5 compares to Camp LeJeune?

6 A. I reviewed the material that Mr. Maslia
7 provided in offering that comparison between his
8 work and the work that others have done.

9 Q. So you reviewed Mr. Maslia's expert
10 report about Woburn.

11 A. Yes.

12 Q. Did you review anything else to offer
13 your opinion about the comparison of Woburn to
14 Camp LeJeune other than Mr. Maslia's report in
15 this case?

16 A. It was not relevant for the work that I
17 was doing. So, therefore, I did not.

18 Q. Just a couple more questions. Then
19 we'll take a break.

20 Can you tell me how far back in time the
21 wells at Woburn operated that Dr. Pinder offered
22 his analysis on? In other words, how long were
23 those wells operating?

24 A. I cannot do that.

25 Q. How far back in time did Dr. Pinder

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1 model? From when the contaminants were disposed
2 of until the alleged contamination, what was that
3 timeframe?

4 A. You're asking me questions about a case
5 that I did not review because it is irrelevant to
6 the opinion that I'm offering here regarding the
7 criticisms on this model.

8 Q. But you've talked about Camp LeJeune and
9 the fact that it went back 30 or 40 years. And
10 that's one of your criticisms, that there weren't
11 data that far back.

12 So I'm just asking when you're comparing
13 Woburn to Camp LeJeune, how far back did Woburn go
14 in the hind casting?

15 A. I do not know that. But again, it is
16 irrelevant to my criticism of Camp LeJeune because
17 I have specific comments with respect to how the
18 work was done for Camp LeJeune.

19 Q. You can't tell us today how far back
20 Dr. Pinder modeled, can you?

21 A. No, I cannot.

22 Q. Did Dr. Pinder have concentration
23 measurements that he could use to calibrate his
24 model?

25 MR. ANWAR: Object to form.

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1 THE WITNESS: I am not familiar with the
2 details of that work to answer that question.

3 BY MS. BAUGHMAN:

4 Q. Did Dr. Pinder have available to him
5 historic concentrations of the contaminant that
6 had been dumped by any of the industries that were
7 at issue?

8 MR. ANWAR: Object to form.

9 THE WITNESS: I do not know the details
10 of that work to answer this question.

11 BY MS. BAUGHMAN:

12 Q. Do you know whether Dr. Pinder performed
13 calculations and modeling to determine how long it
14 would take the PCE to reach the water wells at
15 issue in the Woburn case?

16 A. I do not recall that.

17 Q. You don't know. Do you know what
18 opinions Dr. Pinder actually did reach?

19 MR. ANWAR: Object to form.

20 THE WITNESS: No. I did not remember
21 that, the details of that, no.

22 BY MS. BAUGHMAN:

23 Q. Do you know whether Dr. Pinder used
24 historical reconstruction to prove that
25 individuals had been exposed to PCE?

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1 MR. ANWAR: Object to form.

2 THE WITNESS: The only thing that I
3 can -- the only opinion that I can offer with
4 respect to that work was essentially what
5 Mr. Maslia provided as a comparison of different
6 cases. And for this one he illustrated the fact
7 that the work that was done for Woburn was not
8 same as what was done at Camp LeJeune for the
9 level of detail that Camp LeJeune sought to
10 provide calculations.

11 MS. BAUGHMAN: I'm going to object as to
12 nonresponsive.

13 THE WITNESS: That's the extent of what
14 I know about the Woburn case or the other cases.

15 MS. BAUGHMAN: I'll object as to
16 nonresponsive.

17 BY MS. BAUGHMAN:

18 Q. The extent of what you know about Woburn
19 is what you read in Mr. Maslia's expert report;
20 fair?

21 MR. ANWAR: Object to form.

22 THE WITNESS: He was the one that
23 provided the summary, and I commented on that
24 summary.

25

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1 BY MS. BAUGHMAN:

2 Q. The extent of what you know about Woburn
3 is what you read in Mr. Maslia's expert report; is
4 that true?

5 MR. ANWAR: Same objection.

6 THE WITNESS: Like I said, I'm not
7 familiar with the details of the Woburn case other
8 than what Mr. Maslia has provided in his summary.

9 BY MS. BAUGHMAN:

10 Q. You didn't read anything about Woburn
11 for your opinion in this case other than
12 Mr. Maslia's expert report; is that true?

13 MR. ANWAR: Object to form.

14 THE WITNESS: It was not necessary for
15 the opinions that I offered in this case.

16 MS. BAUGHMAN: Object as nonresponsive.

17 BY MS. BAUGHMAN:

18 Q. You're not answering my question.

19 Whether you think it's necessary or not,
20 did you read anything about Woburn to offer your
21 opinion in this case other than Mr. Maslia's
22 expert report?

23 A. I do not recall reading anything in more
24 detail about the Woburn case.

25 Q. You don't know how detailed Dr. Pinder's

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1 historical reconstruction was because you didn't
2 review it, did you?

3 MR. ANWAR: Object to form.

4 BY MS. BAUGHMAN:

5 Q. You didn't review any of that modeling
6 work, did you?

7 MR. ANWAR: Object to form.

8 THE WITNESS: I don't know how I could
9 have reviewed their modeling work.

10 BY MS. BAUGHMAN:

11 Q. Did you read any publications about
12 Woburn to offer your opinion?

13 A. What do you mean by that?

14 Q. Anything that's been published in the
15 literature.

16 A. I have not reviewed the Woburn case at
17 that level of detail.

18 Q. Mr. Maslia cited some publications about
19 Woburn. Did you read those?

20 A. I did not read any publication that
21 Mr. Maslia offered. I looked at his summary
22 and...

23 Q. In his report?

24 A. That he provided in his report, yes.

25 Q. And that's it?

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1 A. That is correct.

2 MS. BAUGHMAN: We can take a break now.

3 THE VIDEOGRAPHER: Off the record at

4 10:48.

5 (Recess from 10:48 a.m. to 11:06 a.m.)

6 THE VIDEOGRAPHER: On the record at

7 11:06.

8 BY MS. BAUGHMAN:

9 Q. Dr. Spilotopoulos, have you ever worked
10 on a project that had as its goal determining or
11 measuring human exposure to contaminants?

12 A. I have not.

13 Q. Has anyone to your knowledge from S.S.
14 Papadopoulos worked on such a project?

15 A. I do not know.

16 Q. Have you ever worked on behalf of people
17 who've been exposed to contaminants in water or
18 air or soil?

19 A. Not that I can think of, no.

20 Q. We mentioned a few times your work at
21 Hanford. Can you tell us what the Hanford site
22 is?

23 A. Hanford is a federal site. That's where
24 plutonium was enriched back in the '40s as part of
25 the Manhattan project. There was a lot of

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1 contamination. It's a very large site, over 500
2 square miles, several nuclear reactors and
3 groundwater -- soil and groundwater contamination
4 resulting from different activities and a large
5 remediation site in the last few decades where
6 cleanup operations are taking place.

7 Q. Are you still working on the Hanford
8 site, on the Hanford project?

9 A. No, I am not.

10 Q. When did you last work on it?

11 A. As part of contracting work we did, I
12 think it was 2021 maybe, the last year we worked
13 as part of that project.

14 Q. So in your CV, you said that you were
15 the technical lead and lead modeler for certain
16 parts of the Hanford site; is that true?

17 A. That is true.

18 Q. And part of your work for Hanford was to
19 develop and calibrate a groundwater flow and
20 contaminant transport model; right?

21 A. Several groundwater models.

22 Q. You did that to evaluate the migration
23 of hexavalent chromium and other contaminants in
24 the groundwater; right?

25 A. Yes.

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1 Q. And your modeling work to model the
2 migration of hexavalent chromium in groundwater,
3 you used MODFLOW and MT3DMS for that?

4 A. For most of the calculations we
5 performed with respect to modeling, yes.

6 Q. We talked about it earlier. One of the
7 papers you said was about fate and transport
8 modeling is -- I'll mark it as an exhibit.

9 (Spiliotopoulos Exhibit 3 was marked.)

10 BY MS. BAUGHMAN:

11 Q. Our court reporter has marked as
12 Exhibit 3 a 2010 conference paper called
13 Groundwater Modeling in the Support of Remedial
14 Process Optimization: Implementing a Developing
15 Conceptual Site Model into Comparative Remedy
16 Analyses; correct?

17 A. That is right.

18 Q. This is one of your papers that you
19 presented at a conference on contaminant fate and
20 transport; right?

21 A. Yes.

22 Q. And you're the author, you're lead
23 author of Exhibit 3?

24 A. Yes.

25 Q. And Exhibit 3, your 2010 conference

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1 paper, describes model construction calibration
2 used to determine which remedial alternatives to
3 use at Hanford; fair?

4 A. Yes.

5 Q. On the first page, you describe the
6 remedial action objectives, in other words, the
7 objectives you were trying to reach in doing the
8 modeling; right? You were trying to protect the
9 aquatic receptors, this first one. That means
10 fish and aquatic organisms; is that right?

11 A. Yes.

12 Q. You were also trying to protect human
13 health by preventing exposure to contaminants in
14 groundwater; right?

15 A. These are the action objectives for the
16 project, yes.

17 Q. The third was to provide information
18 that will lead to a final remedy; right?

19 A. Correct.

20 Q. The goal there is actually -- the remedy
21 is like to clean up the contamination in the
22 groundwater, right, to at least to an acceptable
23 level?

24 A. Contain or clean up. It depends on the
25 situation.

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1 Q. I'm looking at the second page, and it's
2 not numbered, but the second page of your 2010
3 conference. That first full paragraph says,
4 "Groundwater flow and contaminant transport
5 modeling was performed to support the calculation
6 of appropriate pumping rates for injection and
7 extraction wells to achieve the remedial process
8 optimization objective."

9 So that's what you did. You did this
10 modeling to try to achieve remediation goals;
11 right?

12 A. Yes.

13 Q. On page 2, it does say that MODFLOW is
14 used for the groundwater model; right?

15 A. Yes. We developed -- we used MODFLOW
16 from the groundwater flow model, yes.

17 Q. And also MT3DMS, it says right there on
18 page 2, was used to simulate the contaminant plume
19 migration; right?

20 A. Yes.

21 Q. The primary contaminant you were
22 modeling is chromium 6?

23 A. Correct.

24 Q. And you modeled chromium 6 using monthly
25 periods; right?

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1 A. Monthly stress periods, yes.

2 Q. Forward and backward?

3 A. That was for model calibration, yes, and
4 I believe, if I remember correctly -- I have to go
5 back and see the calibration.

6 The model was looking at how we can
7 develop a pump-and-treat configuration to contain
8 the plume and clean it up to required
9 concentration levels.

10 Q. So you did do predictive modeling then;
11 right? You looked into the future to see, well,
12 if you use this remediation versus that
13 remediation, which one is going to be the best way
14 to clean up and contain the contamination; right?

15 A. Yes.

16 Q. So you did do predictive forward
17 modeling; right?

18 A. Correct.

19 Q. In monthly time steps?

20 A. Yes.

21 Q. And you did backwards in time?

22 A. Yes. We calibrated the model to past
23 data.

24 Q. Did you have past data on chromium in
25 the groundwater?

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1 A. Yes.

2 Q. How far back?

3 A. More years than even the model was
4 calibrated for.

5 Q. On the fourth page -- let me ask you a
6 general question. You didn't have site time
7 specific data for all of the parameters for this
8 model; right?

9 A. Actually at Hanford, there were plenty
10 of site-specific data to be used because there
11 were several analyses that were done to calculate
12 these parameters.

13 MS. BAUGHMAN: I'm going to object as
14 nonresponsive.

15 BY MS. BAUGHMAN:

16 Q. You did not have site-specific data for
17 all of the parameters that you used in your
18 groundwater modeling in Hanford, did you?

19 MR. ANWAR: Object to form.

20 THE WITNESS: Which parameters would you
21 refer to?

22 BY MS. BAUGHMAN:

23 Q. Let's look at their paper on page 4
24 where it says Parameter Values - Model
25 Calibration. Do you see that heading?

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1 A. Yes.

2 Q. The second sentence says, "In
3 particular, values for some of the boundary
4 conditions and aquifer parameters were estimated
5 through a combined manual and automated
6 calibration process."

7 Do you see that?

8 A. Yes.

9 Q. So you did have to estimate some
10 parameters. You didn't have data for all of them,
11 did you?

12 A. But this refers to the distribution of
13 these parameters in the aquifer, which is part of
14 the model calibration process based on available
15 site-specific data. An example of that is
16 hydraulic conductivity distribution. In any model
17 we do not have values everywhere in the model
18 domain, we have to estimate them. The question is
19 whether we have available data to do so.

20 Q. Let's look at the next paragraph. The
21 second sentence, you wrote, "The model was
22 calibrated to data from throughout CY2018."

23 Do you see that?

24 A. CY2008.

25 Q. That means the year 2008. Okay.

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1 Now, what data -- if you look up above
2 at the very top of the page, that's talking
3 about -- from previous page to that page -- it
4 says, "The stress periods correspond to monthly
5 average river stages representing the time varying
6 river stage for the period January 1, 2008 through
7 December 31, 2008. It is assumed that these
8 conditions are representative of the typical
9 conditions in the field and that future conditions
10 will not vary."

11 Do you see that?

12 A. Yes.

13 Q. And then going down below, it says, "The
14 model was calibrated to data from throughout
15 CY2008."

16 Did you have chromium 6 concentrations
17 or just the flow concentrations to calibrate?

18 A. There were water level data available,
19 and there were chromium 6 available data. And I'm
20 just highlighting two key inputs to the model that
21 were used for the model calibration.

22 Q. The next sentence says, "No formal
23 calibration statistics were calculated to
24 determine the goodness of fit of the model results
25 to the measured data."

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ALEXANDROS SPILIOTOPOULOS, PH.D.

1 Did I read that correctly?

2 A. That is correct.

3 Q. Is that true?

4 A. That's what it says there. It's 15
5 years ago.

6 Q. What's a calibration statistic?

7 A. Usually it's the root mean square error
8 or something that calculates the difference
9 between observed and simulated values.

10 Q. How you don't know if observed and
11 simulated values match if you don't do
12 calculations?

13 A. Well, there are different ways of
14 looking at model calibration, and that is
15 sometimes using the statistic and sometimes it's
16 using visual calibration, for example, when you
17 look at hydrographs of water levels or
18 concentrations over time to see how well you fit
19 the data.

20 Q. So looking at visuals or hydrographs to
21 determine how well data fits for calibration,
22 that's an appropriate methodology?

23 A. That's a methodology. It depends on the
24 number of data available to do that.

25 Q. You used that methodology in Hanford?

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1 A. I will have to go back. I cannot recall
2 exactly what the specifics were, what the data we
3 used for that one. Again, like I said, it was 15
4 years ago.

5 We have developed models for a much
6 longer period of time with lots of data. We have
7 calculated calibration statistics. It's in the
8 reports that we have published for Hanford. So
9 this is just one example where a specific
10 calculation was performed. And that was a scoping
11 in calculation based on limited data apparently if
12 we're looking for one year.

13 Q. You then said in that same paragraph,
14 "In addition, maps of water level contours
15 calculated by the model were compared to contours
16 included in published reports."

17 So that's another way of doing
18 calibration, right, comparing the maps?

19 A. Again, that was a limited calibration
20 process based on limited data available at the
21 time as far as I recall. At that time the
22 conditions in the K area were being under
23 development. The remediation scheme was evolving.
24 There were a few wells in place, and they were
25 planned on adding more.

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1 So that was a scoping calculation with
2 respect to what we could expect for the
3 contaminant migration to be and what it would take
4 to capture that plume. That was a two-dimensional
5 plume model as far as I remember. So it was in
6 the very early stages of the design process. This
7 was, by no means, a regress calibration of the
8 model.

9 Q. So for your modeling of chromium 6 at
10 Hanford, did you have a calibration target for the
11 chromium?

12 A. You mean for this particular
13 application?

14 Q. Well, the idea was that you did modeling
15 of chromium 6 predict inned the future, right, to
16 determine the best remediation strategy; right?

17 A. Yes.

18 Q. And you say that you calibrated the
19 model with chromium 6 data; right?

20 A. Correct.

21 Q. What was calibration target?

22 A. There wasn't a single calibration target
23 because the dataset was too small for that. This
24 was again a visual qualitative calibration of the
25 model because there were not enough data for us to

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1 use for a rigorous calibration.

2 So again, this model was created with
3 best information available at the time to be used
4 as a scoping calculation for how the remediation
5 system could be designed.

6 Q. Not just how it could be designed. You
7 made recommendations to the federal government on
8 how to design their remediation at Hanford based
9 on this model; right?

10 A. Well, there are additional dimensions to
11 this. This is only one part of the process at the
12 time that used this modeling to estimate what the
13 migration could be. As part of that effort,
14 there's also recommendations for monitoring to
15 collect additional data and see whether these
16 predictions can be accurate so adjustment to the
17 remediation scheme can be performed.

18 Q. Well, we're going to look through the
19 paper.

20 You agree with me that you and your
21 colleagues made recommendations based on this
22 model at the time in 2010 on what to do to meet
23 2012 and 2020 goals on remediation. You used the
24 model to do that then; right?

25 A. That was preliminary estimates that they

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1 were developed using a scoping calculation and a
2 model that was calibrated to limited data at the
3 time to guide the remediation process. The
4 recommendations that came out of this were
5 essentially suggesting that wells could be placed
6 at several locations to start containing the
7 plume.

8 But there is a lot more that goes with
9 it, which is monitoring program, collection of
10 additional data and adjustments to the remediation
11 effort, which has happened over the year since
12 then.

13 Q. Turn to -- I know you don't have numbers
14 on yours, but toward the end, there's a Results
15 and Discussion section.

16 Do you see that?

17 A. Yes.

18 Q. Under Results and Discussion, you've
19 written, "The proposed design for attainment of
20 the 2012 and 2020 goals consist of the following
21 as a minimum."

22 And you have six bullet points of
23 recommendation of your proposed design; correct?

24 A. Correct.

25 Q. And that proposed design includes, among

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1 other things, 40 new -- I'm sorry -- yeah, 40 new
2 extraction/injection wells in the 100-H area and
3 30 new extraction/injection wells in the 100-D;
4 correct?

5 A. Correct.

6 Q. So at least 70 new wells among other
7 recommendations you were making at the time;
8 correct?

9 A. Yes.

10 Q. And that based on this model that we're
11 talking about right now with the information you
12 had available at that time; correct?

13 A. That was an initial proposal, yes.

14 Q. And the modeling that you did to make
15 that proposal, you just -- you didn't have a
16 calibration target, right, for your chromium 6
17 model?

18 A. There were not sufficient data to do
19 that. Again, this was a design effort to start
20 the remediation process and provide a framework
21 for developing the remediation scheme, which was
22 further updated in years to come.

23 In fact, this model here was just the
24 basis for what became a much more expensive model
25 after that, multiple layers. There was additional

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1 efforts in more recent years to do more focused
2 modeling and refine the process. So this is just
3 a snapshot of the work that was done to design the
4 remedial scheme.

5 MS. BAUGHMAN: I'm going to object as
6 nonresponsive to everything after the initial
7 first sentence of the answer.

8 BY MS. BAUGHMAN:

9 Q. Let me go back to the page 4 and the
10 parameter values model calibration.

11 When you're talking about these contours
12 that you used --

13 A. I'm sorry. Can you give me a second to
14 go back there?

15 Q. Talking about the water level contours
16 that were calculated and compared to contours in
17 published reports. Were calculations done
18 regarding the goodness of fit of those contours?

19 A. No. That wouldn't be meaningful at the
20 time because the monitoring network at the time
21 was very limited. So there were only a few data
22 available. On the basis of that, water level maps
23 were created using interpolation methods, for
24 example, as an interpretation of these data across
25 a much larger area and the model attempted to get

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1 as close to these water levels as possible so we
2 can have some confidence that the model is
3 representative to some extent to the limited data
4 available.

5 Q. With respect to chromium 6 at the time,
6 what method did you use to determine whether your
7 predictive model values reasonably fit measured
8 data?

9 A. The predicted values could not match
10 data because there were no data available at the
11 time. This was a predictive calculation to
12 determine whether the limited information
13 available at the time and dissolved chromium plume
14 that was delineated on the basis of these limited
15 data, where it was possible to migrate to and what
16 would be needed to contain that plume. That was
17 the level of effort at the time.

18 Q. So you didn't have data to measure what
19 your predictions -- to say whether your
20 predictions would be accurate; fair?

21 A. I could not have data from the future to
22 evaluate whether my predictions were correct.
23 That came afterwards, and adjustments were made to
24 the design on the basis of these new data.

25 Q. So had you calibrated at this time, in

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1 2010, your chromium 6 with past chromium data?

2 A. We had very limited data over a short
3 timeframe as wells were installed, and data were
4 collected. Those provided the basis of limited
5 interpretation of the extent of contamination in
6 the aquifer. On the basis of that limited
7 interpretation we were asked to evaluate the plume
8 migration in the future knowing, of course, that
9 additional data would be collected in the future
10 and those calculations would be updated.

11 Q. But at that time in 2010, what analysis,
12 what method did you use to determine how -- let me
13 ask you this: Had you done a sensitivity analysis
14 or an uncertainty analysis with regard to your
15 predictions of chromium 6 levels with a different
16 remediation?

17 A. Well, actually an uncertainty analysis
18 has been done.

19 Q. No, at this time in 2010. That's what
20 I'm asking. Had it been done then?

21 A. That's what I'm providing. Yes. During
22 that time, not presented in this paper, a
23 sensitivity and uncertainty analysis was done to
24 see based on the limited information available
25 what could be possible plume migrations and what

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1 the remediation system could do to contain that
2 plume migration in the future based on the limited
3 data available. And, in fact, a sophisticated
4 uncertainty analysis was done at the time to do
5 that again with the data available at the time.

6 This is a scoping calculation that is
7 very common in what we could. Based on limited
8 data, we're try to see what is possible to happen.
9 We do not determine what happens. We evaluate
10 what is possible to happen.

11 Q. Your testimony under oath now is that in
12 2010, you did an uncertainty analysis with respect
13 to the transport model for chromium 6.

14 A. We did an uncertainty analysis that
15 evaluated the uncertainty of the hydraulic
16 conductivity fields that would impact plume
17 migration in the aquifer under the remediation
18 schemes.

19 MS. BAUGHMAN: I'm going to object as
20 nonresponsive.

21 BY MS. BAUGHMAN:

22 Q. I'm talking about your uncertainty
23 analysis with regard to your predictions of
24 chromium 6 distribution.

25 Did you do an uncertainty analysis for

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1 that in 2010?

2 A. Yes. The uncertainty analysis we did
3 for the model looked at the uncertainty of the
4 hydraulic conductivity fields in the groundwater
5 flow model and the impact of that uncertainty in
6 the predicted concentrations in the aquifer
7 treatment system and the extraction wells.

8 Q. Your uncertainty analysis focused on the
9 groundwater flow model; right?

10 A. The uncertainty analysis looked at the
11 conduct activity fields and how those would impact
12 concentrations, yes.

13 Q. That's the flow model, isn't it?

14 A. That was the flow model, yes.

15 Q. Not contaminant transport?

16 A. No. At the time, that was not the scope
17 of that evaluation.

18 Q. So at the time in 2010, you had not done
19 an uncertainty analysis regarding contaminant
20 transport; fair?

21 A. We looked at the uncertainty of the
22 transport simulations because of the variability
23 in the hydraulic conductivity fields.

24 MS. BAUGHMAN: I'm going to object as
25 nonresponsive because I don't think you're

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1 answering the question.

2 BY MS. BAUGHMAN:

3 Q. Did you do a history matching with
4 regard to chromium 6 concentrations for your
5 modeling in 2010 at Hanford?

6 A. For this modeling it was impossible to
7 do because we had very limited data. We have done
8 a lot more modeling work that goes back in time
9 and covers 10 or 15 years of available data for
10 history matching.

11 MS. BAUGHMAN: Object as nonresponsive
12 everything after "it was impossible to do."

13 BY MS. BAUGHMAN:

14 Q. I understand what you're saying, because
15 you're saying you did it then you didn't do it.

16 At the time in 2010 when you made these
17 recommendations regarding the remediation strategy
18 model, had you done history match for chromium 6
19 concentrations?

20 A. This particular model, the only thing
21 that we looked at was one year's worth of data for
22 this scoping calculation. I'm only adding that
23 there's a lot more modeling work that was done at
24 Hanford where we included history matching over a
25 long period of time.

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1 MS. BAUGHMAN: Object as nonrsponsive.

2 BY MS. BAUGHMAN:

3 Q. Talking about this paper and the work
4 presented in this paper. For what's presented in
5 this paper, was history matching done? Had it
6 been done for chromium 6?

7 A. No. There was in history matching in
8 this model. The conditions in 2008 was used as
9 initial conditions for the scoping calculations
10 with respect to the model, this particular model.

11 MS. BAUGHMAN: I'll object as
12 nonresponsive to everything after "no."

13 BY MS. BAUGHMAN:

14 Q. Back to the initial conditions issue in
15 a minute. The modeling that you did that's
16 presented in your 2010 paper, you used one year of
17 data, like you said. That was the flow data from
18 2008; right?

19 A. Correct.

20 Q. And you modeled 12 years into the
21 future; is that right?

22 A. Yes.

23 Q. On page 5, this page --

24 A. Yes.

25 Q. On number three on that page, you've got

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1 the phrase "aquifer testing data are limited." Do
2 you see that?

3 A. Yes.

4 Q. Do you know how many aquifer tests you
5 had at the time?

6 A. I do not recall, but there were very
7 few.

8 Q. I don't know how to pronounce this word.
9 Kriging?

10 A. Kriging.

11 Q. The paper describes under item number
12 four on this page, model calibration describes the
13 use of kriging for your model's hydraulic
14 conductivity; right?

15 A. Correct.

16 Q. Hydraulic conductivity, that's an
17 important parameter when you're simulating
18 groundwater flow; right?

19 A. It is an important parameter.

20 Q. Probably the most important one; right?

21 A. I wouldn't say that. It's very
22 important parameter.

23 Q. My understanding is kriging is a
24 statistical method used to estimate values at
25 locations where data isn't directly available; is

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1 that fair?

2 A. Yes. It's an interpolation technique.

3 Q. So you estimated initial mean values for
4 the hydraulic conductivity using your limited
5 aquifer test data; is that right?

6 A. That is correct.

7 Q. That's because you didn't have hydraulic
8 conductivity data that covered the entire study
9 area?

10 A. Of course.

11 Q. And then those values were updated in
12 the calibration process; right?

13 A. Yes, some calibration again based on the
14 limit data available at the time.

15 Q. Just to be clear, you adjusted hydraulic
16 conductivity using model calibration; right?

17 A. Correct.

18 Q. And that's an appropriate methodology;
19 right?

20 A. In general, yes.

21 Q. Adjusting model parameters during the
22 calibration process, that's a standard practice in
23 groundwater modeling; right?

24 A. We do adjust parameter values during
25 model calibration on the basis of input data that

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1 we have available and calibration data.

2 Q. The next page talks about this in the
3 second full paragraph about effective porosity and
4 a specific yield. Those two parameters, you
5 determined those used model calibration as well;
6 right?

7 A. Yes. That is correct.

8 Q. Then if you look at Contaminant
9 Transport Model, the heading on the page we're on
10 right now, do you do the heading Contaminant
11 Transport Model?

12 A. Yes.

13 Q. It says, "The migration of chromium 6 in
14 response to current and projected well operations
15 in the 100-HR-3 area was simulated to support the
16 remedial optimization process design for attaining
17 the 2012 and 2020 river protection and aquifer
18 cleanup goals."

19 Did I read that correctly?

20 A. Yes, you did.

21 Q. So you were using the contaminant
22 transport model in your projections to determine
23 the best remedial strategy; right?

24 A. We used the groundwater flow model and
25 the contaminant transport model for scoping

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1 calculations to see what kind of a design we
2 should have based on the limited information to
3 protect the river and provide aquifer cleanup, a
4 projection of aquifer cleanup.

5 Q. So under the heading Contaminant
6 Transport Model, then the next subheading is
7 Initial Conditions for that Model; right?

8 A. That's correct.

9 Q. You used chromium 6 concentrations from
10 2008; correct?

11 A. Yes.

12 Q. And that was basically like your source
13 or mass loading. Like that was how much is there
14 to figure out how to decrease it; right? Initial
15 conditions your source loading for this model;
16 right?

17 A. No. There were no source loading in
18 this model actually. This only considered the
19 delineated chromium 6 plume based on the limited
20 data available and being conservative with respect
21 to the concentrations we used so we don't
22 underestimate that plume size when we perform
23 these calculations. That's why the maximum
24 concentrations were used.

25 Q. And then it says here to attain the

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1 initial conditions, you, in this second full
2 paragraph, you said use a stepwise procedure.
3 First, the quantile kriging used to obtain the
4 contours for chromium 6, right, and that would be
5 estimation based on your 2008 data; is that right?

6 A. Correct.

7 Q. Then it says, "The contours were
8 digitized and manually adjusted to reflect
9 institutional knowledge of the historical plume
10 migration and the local conditions affecting the
11 actual chromium 6 distribution in the aquifer."

12 Did I read that correctly?

13 A. Yes.

14 Q. So that means that manual adjustments to
15 your initial conditions of how much chromium 6 was
16 in the water were made based on professional
17 judgment; right?

18 A. What we did, the data from 2008 included
19 a number of wells that were sampled during that
20 year. Other wells were not sampled that year.
21 Therefore, if we only relied on the data from that
22 particular year, we would have missed known extent
23 of the plume from previous years through its
24 migration since it was first introduced in the
25 aquifer.

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1 So we used additional data to provide a
2 more conservative delineation of that plume so we
3 can make sure that in our design, we don't
4 underdesign the system and miss some of that mass.

5 Q. It says here you made manual adjustments
6 to reflect institutional knowledge of the
7 historical plume migration under local conditions;
8 right?

9 A. That is correct.

10 Q. And those manual adjustments means you
11 went in and you added or changed the data; right?

12 A. We enhanced data asset, yes.

13 Q. That was based on professional judgment,
14 wasn't it?

15 A. Yes.

16 Q. Page 9, two pages forward, there's a
17 heading called Model Assumptions and Limitations.
18 Do you see that?

19 A. Yes.

20 Q. It's standard protocol when you write up
21 and you present a report of a model to present the
22 assumptions and the limitations of the model;
23 right?

24 A. In general, yes.

25 Q. A good practice in your field is that if

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1 you're publishing or presenting a report on the
2 model, you would say what are the assumption of
3 this model and what are the limitation; right?

4 A. Of course.

5 Q. It's fair to say all groundwater models
6 include assumptions?

7 MR. ANWAR: Object to form.

8 THE WITNESS: That's a blanket
9 statement, yes. In general, yes, that applies to
10 every model.

11 BY MS. BAUGHMAN:

12 Q. All groundwater models have limitations?

13 A. That is also correct.

14 Q. One of your assumptions and limitations
15 was that that second bullet point, you said that a
16 sensitivity analysis should be performed regarding
17 a vertical no flow boundary.

18 Do you see that?

19 A. Yes.

20 Q. This publication doesn't mention any
21 sensitivity analyses that had been done. Had a
22 sensitivity analysis been done for this model at
23 the time?

24 A. This model was the springboard of the
25 modeling work that was done over several years.

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1 So that model evolved to a three-dimensional model
2 eventually with additional layers and all the
3 proper evaluations of the model sensitivity.

4 Q. As of 2010, had you done your
5 sensitivity analysis?

6 A. No. That was not done. That's why it
7 was included in there as an assumption and
8 limitation.

9 Q. We already talked it. If you turn to
10 two pages ahead, the Results and Discussion, that
11 Results and Discussion presents your
12 recommendations at the time of the remedial
13 strategy based on your modeling; right?

14 A. Yes. That is correct.

15 Q. And you said at the bottom of that page,
16 "Given the modeling assumptions and limitations,
17 the calculated chromium 6 distribution at
18 different times in the future should be considered
19 relative estimates and not absolute predictions of
20 the actual plume migration patterns that will
21 prevail."

22 Did I read that correctly?

23 A. Yes, you did because, we're highlighting
24 the fact that we didn't have enough information to
25 say with certainty that that would be plume

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1 migration in the future.

2 Q. At the time you had not done an
3 uncertainty analysis with respect to chrome 6;
4 right?

5 MR. ANWAR: Object to form.

6 THE WITNESS: Not as part of the work
7 that is presented right here.

8 BY MS. BAUGHMAN:

9 Q. When you say that work that's presented
10 here in the paper that we've marked at Exhibit 3,
11 does it follow like proper model calibrations
12 practices?

13 MR. ANWAR: Object to form.

14 THE WITNESS: It did follow practices
15 that could be applied to the conditions presented
16 herein. In other words, we did look at the
17 comparison of water levels, measured to calculate
18 it. We used input data available. And that
19 calibration stopped there because we didn't have
20 enough information to develop a very detailed
21 model. And that's why this model was only used
22 for scoping calculations understanding the
23 limitations that were presented here.

24 BY MS. BAUGHMAN:

25 Q. So your opinion is that whether proper

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1 model calibrations practices have been done
2 depends on the case. It depends on the model.

3 A. It depends on the intended purpose of
4 the model, and it also depends on what data are
5 available to perform that calculation, and,
6 therefore, how confident you are in the calibrated
7 model that you have.

8 Q. Is it also true that -- let me ask you
9 this: Are there published standards in your field
10 on how to do an uncertainty analysis?

11 A. Standards for performing an uncertainty
12 analysis?

13 Q. Yes.

14 A. There are various methods for performing
15 uncertainty analysis.

16 Q. I mean, within your profession, is there
17 like a guideline or a standard where it says okay
18 this is how to do an uncertainty analysis for
19 groundwater flow and contaminant transport
20 modeling?

21 A. Not that I'm aware of.

22 Q. What about for sensitivity analysis, is
23 there a standard within your field that's accepted
24 that says this is how the sensitivity analysis
25 should be performed for groundwater flow and

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1 contaminant transport modeling?

2 A. I would have to go back and look at the
3 standard of calibration and see if sensitivity
4 analysis is mentioned. However, sensitivity
5 analysis in many ways is a very standard approach
6 with respect to how we deal with it in our
7 profession. We all follow the same approach, I
8 would say, to validate the sensitivity of the
9 different parameters.

10 Q. But some models or some modelers might
11 evaluate sensitivity for two parameters or five
12 parameters or eight parameters.

13 Is there a guideline that says when you
14 model the transport of contaminants, you need to
15 or you must do a sensitivity analysis for these
16 specific parameters in this specific way? Does
17 that exist?

18 A. Not that I know of. This is something
19 you evaluate on a case-by-case basis.

20 Q. Were any of your proposed design methods
21 or alternatives implemented based on this work
22 that's presented in Exhibit 3?

23 A. A lot of what is presented here in some
24 form or shape was actually implemented as an
25 interim remedy to initiate the containment of the

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1 contaminant plume and start mass recovery from the
2 well, but it was enhanced over time based on
3 additional data that became available.

4 (Spiliotopoulos Exhibit 4 was marked.)

5 BY MS. BAUGHMAN:

6 Q. Dr. Spilotopoulos, the court reporter
7 has handed you Exhibit 4 to your deposition.

8 Is Exhibit 4 your expert report that was
9 presented in this litigation?

10 A. That appears to be the case, yes.

11 Q. Is that your signature on the first
12 page?

13 A. Yes.

14 Q. Did you write this report?

15 A. Yes, I did.

16 Q. Did anyone assist you other than
17 counsel?

18 A. No. I wrote my report myself.

19 Q. We'll get to the bills or the invoices
20 later, but I notice on the invoices from S.S.
21 Papadopulos, there are a lot of people who worked
22 on this project at your firm.

23 Are you saying no one helped you write
24 your report?

25 A. No one helped me write my report.

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1 Q. Does your report that we've marked as
2 Exhibit 4, does that contain all of the opinions
3 that you will testify to in this litigation?

4 A. Yes.

5 Q. And does your report contain the basis
6 and reasons for each of your opinions that you
7 will testify to in this litigation?

8 A. At a different level of detail, yes.

9 Q. What do you mean by "a different level
10 of detail"?

11 A. Well, in many cases I provide an
12 opinion, and I offer a reason for that. There is
13 underlying details. None of them are listed at
14 that level of detail in my report. There's a lot
15 that comes with it. I provide an opinion that
16 describes the issue at hand and the critique that
17 I provide. It doesn't have all the data or
18 everything I could say it. If you ask me a
19 question, I will provide additional information.

20 Q. Did you purposely leave out any data or
21 references that support any of your opinions in
22 Exhibit 4?

23 A. No. I did not I just provided the
24 description of my opinions and the critique on the
25 model. But there's a lot that goes with it.

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1 (Spiliotopoulos Exhibit 5 was marked.)

2 BY MS. BAUGHMAN:

3 Q. Our court reporter has marked Exhibit 5
4 to your deposition, which is a one-page errata
5 sheet.

6 Are you familiar with that errata sheet?

7 A. Yes.

8 Q. So Other than the two corrections that
9 are identified in Exhibit 5, your errata sheet,
10 have you identified any other changes that you
11 wish to make to your report?

12 A. Not at this time, no.

13 (Spiliotopoulos Exhibit 6 was marked.)

14 BY MS. BAUGHMAN:

15 Q. The court reporter has handed you what I
16 marked as Exhibit 6 to your deposition, which is
17 the Supplemental and Corrective Reliance List
18 that's been provided to us with respect to your
19 report.

20 Have you reviewed this document?

21 A. Yes. I have looked at the information
22 that is included in this document.

23 Q. Did you prepare it?

24 A. I provided information to our secretary
25 that was putting this stuff together. So I

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1 provided references, yes.

2 Q. Does your Supplemental and Corrective
3 Reliance List list all of the documents you've
4 reviewed and you're relying on for your opinions
5 in this case?

6 A. It includes the documents that were
7 available to me and I reviewed a different level
8 of detail.

9 Q. So to be clear, does Exhibit 6, your;
10 Supplemental and Corrective Reliance List, include
11 all of the materials that you considered in
12 reaching your opinions expressed in your expert
13 report in this case?

14 A. At a different level and extent, yes.

15 Q. So I think what you're trying to tell me
16 is you didn't review every document in Exhibit 6
17 cover to cover?

18 A. No, I did not.

19 Q. Some of them you paid more attention to
20 than others; fair?

21 A. That is correct.

22 Q. But are there any documents or data or
23 materials that you are relying on for your
24 opinions in this case that are not on Exhibit 6?

25 A. Not that I can think of at the moment

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1 besides perhaps that came to my attention as part
2 of the depositions that I have attended, in other
3 words, information that was included in these
4 depositions. I'm not sure depositions if
5 depositions are included in here.

6 BY MS. BAUGHMAN:

7 Q. Well, I'll help you out on that. Like
8 the second page lists the deposition of Dr. Aral
9 and the deposition of Mr. Davis. And then on page
10 6, you've got the deposition of Dr. Jones and the
11 deposition of Dr. Konikow. And I'll tell you that
12 this was dated or provided to us on February 28,
13 2025.

14 So given that, is there any document,
15 data or information you're relying on for your
16 opinions that is not provided on Exhibit 6?

17 A. Dr. Maslia's deposition of last week is
18 not there. That's what comes to mind. I don't
19 think I can think of something else right now that
20 is not there.

21 Q. If we added in Mr. Maslia's deposition
22 to Exhibit 6, it would be complete; fair?

23 A. I would think so.

24 Q. You don't have anything else to add
25 today?

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1 A. Not off the top of my head, not at this
2 time.

3 Q. Have you actually read all of the
4 documents that are on Exhibit 6?

5 A. No, I did not.

6 Q. Is there a way for us to be able to tell
7 which ones you read and which ones you didn't?

8 A. I don't think so. There are things that
9 I may have checked in different documents.
10 There's certainly the ATSDR documents that I read
11 in more detail depending on the content and what
12 was relevant to my opinions.

13 Q. Why would there be documents on
14 Exhibit 6 that you haven't read? Why would those
15 be included?

16 A. If they were available to us.

17 Q. In other words, the lawyers provided you
18 the documents?

19 A. We have these documents, yes, available.

20 Q. So anything the DOJ lawyers said to you
21 you included on your reliance list even if you
22 didn't read it; is that fair?

23 A. It is included in here because I'm
24 assuming that this is something I needed to
25 disclose as being in my possession and available

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1 to me to review.

2 Q. You've attended by Zoom many depositions
3 taken in this case; right?

4 MR. ANWAR: Object to form.

5 THE WITNESS: I have attended the
6 depositions of the people listed here including
7 Mr. Maslia's deposition last week.

8 BY MS. BAUGHMAN:

9 Q. You've also attended Dr. Waddill's
10 deposition, right, by Zoom?

11 A. No, I did not. I don't believe I did.
12 I don't recall attending it. I could be wrong.

13 Q. What about Renee Suárez?

14 A. That's a good question. I'm not sure.

15 Q. Susan Martel?

16 A. No.

17 Q. Did you assist with preparing any of
18 those individuals for the depositions?

19 A. No.

20 Q. Have you had any calls or meetings or
21 Zooms or other communications with Dan Waddill
22 about this case?

23 A. No.

24 Q. You refer in your report to Dan Waddill
25 as the Navy's water modeling expert. That's on

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1 page 8 if you want to look at it.

2 My question you to is: What makes
3 Dr. Waddill an expert on modeling, groundwater
4 modeling?

5 MR. ANWAR: Object to form.

6 THE WITNESS: That's how he has been
7 described in different documents where his
8 opinions are stated.

9 BY MS. BAUGHMAN:

10 Q. Are you familiar with Dr. Waddill's
11 expertise, to the extent he has it, in groundwater
12 modeling?

13 A. No.

14 Q. Do you know whether Dr. Waddill has ever
15 developed a model, a groundwater model?

16 A. I'm not aware of his work.

17 Q. Do you know whether Dr. Waddill has even
18 read a groundwater model himself?

19 A. I don't know. I'm not familiar with his
20 work.

21 Q. Have you reviewed the rebuttal expert
22 reports of Dr. Konikow?

23 A. Yes, I have.

24 Q. Did you review Mr. Maslia's rebuttal
25 report?

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ALEXANDROS SPILIOTOPOULOS, PH.D.

1 A. Yes.

2 Q. And what about Dr. Jones and Mr. Davis?

3 A. Yes.

4 Q. Dr. Sabatini?

5 A. No.

6 Q. We've already talked about Dr. Konikow.

7 Do you know any of the others personally? Do you
8 know Mr. Maslia personally?

9 A. No. I only saw Mr. Maslia in 2005
10 during the expert panel meeting event.

11 Q. That's the only time you've ever seen
12 him in person?

13 A. Yes.

14 Q. What about Dr. Jones and Jeff Davis, do
15 you know them?

16 A. I've never met them in person.

17 Q. Dr. Sabatini?

18 A. No.

19 Q. I assume you never worked with
20 Mr. Maslia or Dr. Jones or Mr. Davis or
21 Dr. Sabatini?

22 A. No.

23 Q. You had heard of Mr. Maslia before this
24 case. Had you heard of any of the others other
25 than Dr. Konikow?

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1 A. I know Mr. Maslia from this case only.
2 Mr. Konikow I mentioned. The other ones, Dr. Aral
3 I know by name, but I'm not familiar with his
4 work. Dr. Jones, to the extent that he was
5 involved in the development of GMS, which is a
6 software that people use in our industry, but not
7 Mr. Davis.

8 Q. What's your opinion of the professional
9 reputation of Mr. Maslia in the groundwater -- in
10 the hydrogeology industry?

11 A. I don't have an opinion because I'm not
12 familiar with his work. I'm only familiar with
13 work done for the ATSDR. I'm not familiar with
14 this work otherwise.

15 Q. Have you reviewed any of the
16 Mr. Maslia's publications in the peer-reviewed
17 literature?

18 A. I've only looked at the Auburn case
19 report in trying to see what kind of connection it
20 may have, how it could compare with the work done
21 by ATSDR for the calculation.

22 Q. So you read his publications on the
23 Dova. Anything else?

24 A. I have not.

25 Q. Your report mentions on page 1 that you

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1 reviewed interview summaries. Interviews of who?

2 A. I'm sorry. Where are you?

3 Q. So the second to last paragraph on
4 Section 1, page 1, talks about all the different
5 kinds of materials you've reviewed. And one of
6 them says interview summaries.

7 Which interview summaries did you
8 review?

9 A. I'm trying to remember if it was just
10 the information we collected during the site visit
11 and with the scope of people there, and they
12 provided information on the operation of the
13 treatment system and the components of the
14 treatment system.

15 Q. I'm sorry. So you went to site. I'm
16 going to ask you about that. So you're saying
17 there were interview summaries made regarding your
18 visit to Camp LeJeune?

19 A. As we took notes during the site visit
20 of the information we got from people working at
21 Camp LeJeune on past operations and knowledge of
22 the system components.

23 Q. And did you do that yourself? You took
24 notes from those site visits?

25 A. I do not recall if they were just my

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1 notes or others.

2 Q. How many people were with you?

3 A. There were a large group of people
4 including the lawyers, other experts, I believe.

5 Q. And when was this meeting? When was
6 this visit?

7 A. May of 2024.

8 Q. And who did you interview, or who did
9 you speak to about past Camp LeJeune operations?

10 A. I don't remember the names of the people
11 that we met. But there were people like operators
12 of the treatment system. I'm trying to remember
13 the name of the person that gave us the
14 introduction. Williams, I'm trying to remember if
15 that's right.

16 Q. Scott Williams?

17 A. Scott Williams, yeah, because he
18 accompanied us through the whole site visit.

19 Q. So you, yourself, took notes at the site
20 visit; is that right?

21 A. I think I did.

22 Q. And when you refer to that you relied on
23 interview notes, you also reviewed notes of other
24 people from that site visit?

25 A. No. That would be my notes of people

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1 that gave us information, but I don't recall. I
2 can't remember the notes that I took.

3 Q. Are those the only interview summaries
4 you're relying on, the notes that you took at your
5 site visit?

6 A. I'm trying to remember if I had anything
7 else that I relied on. I can recall, off the top
8 of my head, if there was something else.

9 Q. So that's the only time you been at Camp
10 LeJeune, that one time in May 2024?

11 A. That is correct.

12 Q. How long were you there?

13 A. One day.

14 Q. All day long?

15 A. Yes. It was a day visit, sometime in
16 the morning.

17 Q. You remember Scott Williams. Do you
18 remember anyone else that you gathered information
19 from?

20 A. I don't remember their names, but there
21 were different people involved in the operations
22 and providing us the tour.

23 Q. What did you tour specifically?

24 A. Things that I can readily recall were
25 the treatment systems and Tarawa Terrace and

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1 Hadnot Point. And we stopped at different
2 locations like the landfill area Hadnot Point. We
3 toured by bus those two parts of the base. And
4 then we went by bus all around the other side of
5 the river, the other areas including the training
6 zone as far as I remember. These are the things I
7 can readily recall of my visit.

8 Q. The Tarawa Terrace treatment plant is
9 shut down; right?

10 A. Yes.

11 Q. But you were still actually able to tour
12 it?

13 A. We toured plant to see where water was
14 coming in, where the tanks were, trying to get the
15 lay of the land with respect to how water was
16 coming to treatment plant and where samples were
17 taken, for example.

18 Q. So it's still existing. It's just shut
19 down, not operating?

20 A. I don't know its current operation.

21 Q. Well, when you toured the Tarawa Terrace
22 water treatment plant, was it operating?

23 A. There was water there, yes.

24 Q. So they were treating water at the
25 plant?

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1 A. I do not recall what the operations were
2 at the time.

3 Q. Do you know what the Tarawa Terrace
4 water treatment plant is being used for now?

5 A. I don't know its current use.

6 Q. Tell me, is there information that you
7 gained from your site visit at Camp LeJeune that
8 you're relying on for your opinions?

9 A. Other than getting a sense of the area
10 extent and the lay of the land, like I said,
11 nothing else.

12 Q. Did you take any photographs or videos
13 of Camp LeJeune while you were that?

14 A. I did not personally take pictures. I
15 appointed the lawyers to take pictures that could
16 be of interest in terms of remembering the lay of
17 the land.

18 Q. Are the lawyers the only ones who took
19 pictures while you were there?

20 A. Yes, as far as I recall.

21 Q. Was there video taken?

22 A. I do not recall.

23 Q. How long have you been consulting with
24 the Department of Justice regarding Camp LeJeune?

25 A. As far as this litigation, I started

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1 working maybe sometime in 2023, if I remember
2 correctly.

3 Q. You said as part of this litigation.
4 Have you done work regarding Camp LeJeune that's
5 not part of this litigation?

6 A. I was on the expert panel in 2005. So
7 that timeframe.

8 Q. What were you doing -- who was employing
9 you to be at the expert panel in 2005?

10 A. In 2005 Gordon Bennett and Remy Hennet
11 asked me to attend the meeting so I can see what
12 is discussed about the development of the model at
13 the time, the data available, and how they were
14 considered, and just listen in and provide them
15 with information about that.

16 Q. Were you working for a particular
17 client?

18 A. I didn't know at the time who the client
19 was. I was just asked by the principal,
20 Dr. Bennett and Dr. Hennet to attend the meeting.
21 So I didn't know the details.

22 Q. Did you bill your time to a specific
23 file?

24 A. My time was billed on the project, yes.

25 Q. What project was it?

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1 A. I don't recall the name of that.

2 Q. Was it for the Department of Justice?

3 A. Well, at the time for me, it was project
4 the number. I believe it was part of consultation
5 to the Department of Justice at the time.

6 Q. Did you take notes at the expert panel
7 meeting?

8 A. I don't recall.

9 Q. Did you submit any kind of report or
10 writeup or email to Mr. Gordon Bennett and Remy
11 Hennet about what you learned?

12 A. I briefed them when I came back because
13 that was the intent of my visit. So I told them
14 what I heard, but I do not recall if there were
15 any notes involved.

16 Q. Other than attending the expert panel in
17 2005, did you do any other work related to Camp
18 LeJeune prior to being retained in this case in
19 2022?

20 A. I do not recall doing any work after
21 that time. No, off the top of my head, I do not
22 recall doing other work.

23 Q. Are you aware of work that
24 Spilotopoulos -- I'm sorry -- that Papadopoulos &
25 Associates has done for the DOJ prior to 2022

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1 regarding Camp LeJeune?

2 A. I know Dr. Hennet has provided services,
3 but that's as far as I can go with what I know
4 about the project. I don't know any other details
5 or who else has been involved in that.

6 Q. Do you know what he's done before 2022
7 for the DOJ at Camp LeJeune?

8 A. Not in any detail, no.

9 Q. And you did not assist him with that
10 work other than attending the one expert panel
11 meeting?

12 A. That is correct.

13 Q. Has S.S. Papadopoulos had any role
14 regarding remediation of Camp LeJeune?

15 A. I'm not aware of any of that.

16 Q. Have you at any time recommended any
17 testing done at Camp LeJeune?

18 A. No.

19 Q. Or any specific remediation?

20 A. No, I have not.

21 Q. Has all of your work related to Camp
22 LeJeune been for the purpose of litigation?

23 A. I'm not sure how to answer that
24 question. My participation in 2005 was part of
25 work that SSPA or Dr. Hennet was doing at the

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1 time.

2 Q. Let's separate that out to be clear.
3 You don't know whether -- for what reason
4 Dr. Hennet asked you to be at that expert panel
5 meeting, whether it was for litigation or
6 something else; right?

7 A. I have no idea.

8 Q. I'm going to set that aside.

9 After that, the next time you did work
10 on this case was when you were retained for this
11 litigation. I'm sorry. After going to the expert
12 panel meeting, the next time you did work related
13 to Camp LeJeune was part of this case; correct?

14 A. As far as I can recall, yes.

15 Q. So other than attending one expert panel
16 meeting, it's fair to say that all of your work,
17 your professional work related to Camp LeJeune has
18 been done for the purpose of litigation; right?

19 A. To the best of my recollection, yes.
20 It's 2023, so it was part of that litigation.

21 Q. Other than attending one expert panel
22 meeting, you haven't done any other work related
23 to Camp LeJeune that was not conducted for the
24 purpose of litigation. True?

25 MR. ANWAR: Object to form.

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ALEXANDROS SPILIOTOPOULOS, PH.D.

1 THE WITNESS: Of this litigation?

2 BY MS. BAUGHMAN:

3 Q. Yes.

4 A. No. For this litigation is the work
5 that is presented here in my expert report.

6 Q. The answer is kind of confusing because
7 you said no, but I think you mean yes. So let me
8 just ask it again to be clear.

9 Other than attending one expert panel
10 meeting, all of your related to Camp LeJeune has
11 been conducted for the purpose of this litigation;
12 correct?

13 A. Work that I did back in 2005, that
14 included that visit at the expert panel meeting, I
15 do not recall. Maybe I reviewed some documents,
16 for example, and things like that back at that
17 time. That's all I can remember about the work
18 that I have done with respect or related to Camp
19 LeJeune until my involvement in this litigation.

20 Q. Other than attending the expert panel
21 meeting in 2005, can you identify any work that
22 you have done related to Camp LeJeune in your
23 career that was not related to litigation,
24 specifically this litigation?

25 A. No other work that I have done is

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1 related to this litigation. If I understand your
2 question correctly, I'm saying that work that I
3 did prior to my involvement in this litigation
4 here for which I provided an expert report, work
5 that I did prior to that was related to my visit
6 in Atlanta for the expert panel meeting and some
7 review of reports and other documents at the time.

8 Q. Let me try it again. Let's try it this
9 way. Other than you attending the 2005 expert
10 panel meeting and reviewing some reports and
11 documents at the time related to that panel
12 meeting, other than that, can you identify any
13 work that you have done that was not -- that was
14 related to Camp LeJeune and not related to
15 litigation?

16 A. I do not recall any other work that I
17 have done.

18 Q. So it's fair to say that the vast
19 majority of your work related to Camp LeJeune is
20 litigation related; right?

21 MR. ANWAR: Object to form.

22 THE WITNESS: This litigation work here,
23 yes.

24 BY MS. BAUGHMAN:

25 Q. When you attended the expert panel

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1 meeting, you were just an observer right?

2 A. That is correct.

3 Q. And you don't know whether the DOJ paid
4 for you to be there or not. You just know that
5 you billed it to whatever code your boss told you
6 to bill it to; right?

7 MR. ANWAR: Object to form.

8 THE WITNESS: Yes. I provided my
9 expenses to our accounting.

10 BY MS. BAUGHMAN:

11 Q. Did you speak at the expert panel
12 meeting in 2005 about Camp LeJeune?

13 A. No, I did not.

14 Q. That wasn't a very good question.

15 The expert panel meeting in 2005, it was
16 about the water modeling for Camp LeJeune; right?

17 A. Yes.

18 Q. Did you speak at that meeting?

19 A. No, I did not.

20 Q. And the panel was presenting
21 methodologies -- to be clear let -- me back up.

22 That expert panel had ATSDR scientists
23 presenting to the panel their methodologies that
24 they were using to model groundwater flow and
25 contaminant transport at Camp LeJeune; right?

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1 A. At the time, yes, they presented
2 methodologies and I believe some preliminary
3 approaches to performing groundwater flow
4 modeling. I believe they had some draft results
5 of discussions revolved around how this model was
6 constructed. The panel experts provided comments.
7 And there were some discussion of the next steps,
8 I believe, that would include transport modeling
9 as well.

10 Q. And the focus at that time at that 2005
11 expert panel meeting was about Tarawa Terrace;
12 fair?

13 A. That is correct.

14 Q. The subject of your expert report in
15 this case, Exhibit 4, is a critique of some of
16 those methodologies that were presented at that
17 meeting; right?

18 A. It's a critique of the implementation of
19 the methodologies for reconstructing contamination
20 history at Tarawa Terrace.

21 Q. Did you raise any of the concerns you
22 about ATSDR's modeling methodology or
23 implementation of it with the panel when the
24 observers at the meeting were given an opportunity
25 to speak?

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1 MR. ANWAR: Object to form.

2 THE WITNESS: I don't think I was in a
3 position to offer an opinion at the time. I was
4 just listening to what they were presenting as an
5 approach. I didn't have an opinion at the time.

6 BY MS. BAUGHMAN:

7 Q. You said you had reviewed some
8 documents; right?

9 A. Documents that I reviewed at the time, I
10 think they were general about groundwater
11 modeling, hydrogeology, something to give me some
12 understanding of the setting at Camp LeJeune as
13 far as I recall.

14 Q. So when you listened to the ATSDR
15 present regarding their methodologies and their
16 preliminary results, at that time, you didn't have
17 any critique to provide them?

18 A. No.

19 Q. You didn't have any criticisms to voice?

20 A. I didn't know enough about it, and I was
21 not familiar with that work at all. So I was just
22 listening in to provide information to Dr. Hennet
23 and Dr. Bennett on what was discussed. That was
24 the extent of my involvement at the time.

25 Q. Just to be clear, based on your review

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1 of documents and your attendance at that 2005
2 meeting, you did not make any recommendations to
3 the ATSDR regarding the methodologies that they
4 were using for groundwater flow and contaminant
5 transport or how to implement them? You did not
6 make any recommendations; right?

7 A. I did not.

8 MR. ANWAR: Object to form.

9 BY MS. BAUGHMAN:

10 Q. You did not?

11 A. I did make any recommendations. I was
12 not familiar enough with the project to do that.

13 Q. So you didn't make any recommendations
14 to ATSDR; right?

15 A. I did not.

16 Q. You didn't make any comment at the
17 meeting to the expert panel right?

18 MR. ANWAR: Object to form.

19 THE WITNESS: No, I did not make any
20 recommendations.

21 BY MS. BAUGHMAN:

22 Q. Did you report back to Gordon Bennett
23 and Remy Hennes regarding your thoughts on how the
24 ATSDR should do anything differently than what
25 they were doing?

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1 A. Like I said, I was not familiar enough
2 to provide critique, opinions or anything to that
3 effect. I only provided a briefing on what I
4 heard that ATSDR was doing and some of the
5 comments and thoughts that I heard from the panel
6 experts to the extent that I could fully assess
7 them and understand them within the context of
8 this project and my very short involvement in it.

9 Q. The ATSDR modeling project went on, as
10 you know, for several years; right?

11 A. Yes.

12 Q. To your knowledge, did you or anyone
13 else from S.S. Papadopoulos make any recommendation
14 to ATSDR about the methodologies they were using
15 for groundwater flow and contaminant transport or
16 the implementation of them or anything they should
17 do differently?

18 MR. ANWAR: Object to form.

19 THE WITNESS: I'm not aware of anything
20 like that.

21 BY MS. BAUGHMAN:

22 Q. Dr. Hennet, he was involved in a more
23 detailed and a higher level of detail working at
24 the DOJ at that time than you; right?

25 MR. ANWAR: Object to form. Foundation.

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1 THE WITNESS: I do not know what his
2 involvement was.

3 BY MS. BAUGHMAN:

4 Q. To your knowledge, did Dr. Hennessey ever
5 make a recommendation to the ATSDR that they
6 should do anything differently with respect to
7 their groundwater modeling project for Camp
8 LeJeune?

9 A. I do not know.

10 MR. ANWAR: When you're at a good place,
11 we're coming close to 12:30. It might be a good
12 time for a lunch break.

13 MS. BAUGHMAN: Sure. We can take a
14 lunch break.

15 THE VIDEOGRAPHER: Off the record at
16 12:27.

17 (Recess from 12:27 p.m. to 1:35 p.m.)

18 THE VIDEOGRAPHER: On the record at
19 1335.

20 BY MS. BAUGHMAN:

21 Q. Dr. Spiliotopoulos, you know you're still
22 under oath?

23 A. Yes.

24 Q. Did you talk to the DOJ counsel about
25 any of your substantive testimony during the lunch

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1 break?

2 A. No, I did not.

3 Q. Earlier today we had a discussion about
4 your interview notes, in particular notes that you
5 and perhaps others took when you visited Camp
6 LeJeune in approximately May, 2024. I'll make a
7 formal request that you produce those notes.

8 Do you have any problem with producing
9 them?

10 MR. ANWAR: I will just jump in. We'll
11 discuss, but we object. We served our objections
12 on the basis of work product privilege as that
13 was -- all of that work was conducted in
14 anticipation of litigation or in litigation.

15 So our view is that is work product
16 privilege. But we'll note your request. That's
17 protected by the work product privilege, but we'll
18 note your request. I'm happy to meet and confer
19 with you on it.

20 BY MS. BAUGHMAN:

21 Q. Dr. Spilotopoulos, you're relying in
22 part on your visit to Camp LeJeune for your
23 opinions in this case; right?

24 A. With respect to the opinions that I
25 provided here, I do not think that anything that I

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1 saw during the visit form the basis for my
2 opinions.

3 MR. ANWAR: I'm sorry to interrupt you.
4 You're asking about the 2005 notes or the site
5 visit notes? I'm sorry if I confused the issue.

6 MS. BAUGHMAN: I think it was 2004.

7 MR. ANWAR: 2004?

8 MS. BAUGHMAN: Yeah.

9 THE WITNESS: 2024 site visit.

10 MR. ANWAR: I'm assuming you're
11 referring to that one; right?

12 BY MS. BAUGHMAN:

13 Q. May 2025 hasn't happened yet. You said
14 May 2024 is when you went there?

15 A. Yes, last year.

16 Q. That's the one I'm
17 talking about. You went to Camp LeJeune, and you
18 testified that you took notes; right?

19 A. I believe I took some notes, yes.

20 Q. Right. And is it your testimony you're
21 not relying for your opinions in this case on
22 anything that you learned during your suit visit
23 at Camp LeJeune?

24 A. No. The things that I heard about and
25 people described to us did not help me form my

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1 opinions.

2 Q. So when you testify, you're not going to
3 tell the court that you have like increased
4 knowledge compared to someone else because you
5 actually visited the site and talked to to the
6 people and you learned something there. That's
7 not relevant. Your site visit isn't relevant at
8 to your opinions; is that true?

9 MR. ANWAR: Object to form.

10 For the opinions I provide regarding the
11 modeling work, the things I learned at the site
12 there did not help me in any way.

13 BY MS. BAUGHMAN:

14 Q. So on page 1 of your report, you talk
15 about what you did and what you reviewed and what
16 you're relying on for your opinions, and you
17 listed your interview summaries as some of the
18 materials that you reviewed. But you're saying
19 even though you reviewed the interview summaries,
20 your not relying on them for any opinion?

21 A. I'm saying that the notes that I took
22 with respect to what I saw there and the
23 information that I got during my visit helped me
24 understand the lay of the land, where things are,
25 where the treatment plants are, the Tarawa Terrace

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1 residential area, for example. But that's to form
2 a visual context of the area.

3 The opinions that I provide here are
4 based -- rely on -- I'm looking at the model
5 implementation. So I have them in my mind, but I
6 don't think that there's something in those notes
7 that I took directly and used them here. I
8 considered them. I remember what I saw. That's
9 why I'm listing it there for completeness. But I
10 don't think there was anything that I took from
11 those notes used them in my analysis.

12 MR. ANWAR: I just want to clarify my
13 objection earlier. I misunderstood and thought
14 you were requesting any notes that exist from the
15 2005 panel, 2005 expert panel you had that asked
16 questions about earlier.

17 To the extent there were notes taken
18 related to the site visit along with photographs
19 and things of the like, that stuff, I believe, has
20 been produced. We're happy to go back and check
21 and meet and confer with you about it. The work
22 product objection that I made was with respect to
23 the 2005 expert panel.

24 MS. BAUGHMAN: So just to be clear, I'm
25 asking for any notes that Dr. Spilotopoulos

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1 reviewed or took, either took himself or others
2 related to the 2024 Camp LeJeune site visit. But
3 I'm also, now that you bring it up, requesting
4 notes that you took regarding the 2005 expert
5 panel meeting. You say you have those notes. We
6 request that you produce them.

7 MR. ANWAR: I'll note for the record we
8 served our objections in response to that request,
9 and I believe anything we believe is not protected
10 by the work product doctrine has been produced.

11 MS. BAUGHMAN: So we'll meet and confer
12 about that after the deposition.

13 MR. ANWAR: Sure.

14 (Spiliotopoulos Exhibit 7 was marked.)

15 BY MS. BAUGHMAN:

16 Q. I've handed you marked as Exhibit 7 to
17 the deposition, and that is a series of invoices
18 from S.S. Papadopoulos to the DOJ that were
19 produced to us. And those are Bates-stamped
20 CLJA_SSPA_INVOICES 1 through 442.

21 Have you reviewed these documents
22 before?

23 A. I have seen the document. I haven't
24 reviewed it in detail. This is something that the
25 accounting department has produced.

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1 Q. So you see these are in date order, and
2 page 1 starts for services rendered through
3 August 31, 2022. Do you see that?

4 A. Yes.

5 Q. Is that when your work began in this
6 litigation?

7 A. It is possible. I don't recall the
8 exact date when I started working on this.

9 Q. So these bills don't identify you by
10 name, but are you the senior hydrologist on the
11 case? In other words, if I wanted to know which
12 of these hours were your work, how would I figure
13 that out based on these invoices?

14 A. I'm not sure there are other senior
15 hydrologists involved. It could be me, but I do
16 not recall.

17 Q. What is your title?

18 A. I'm a senior associate, senior
19 hydrogeologist.

20 Q. Has that been your title since August of
21 2022?

22 A. Probably around that time is when I
23 became a senior hydrogeologist. I'm not the only
24 one, but it sounds right. I don't recall the
25 exact date I got the last promotion.

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1 Q. Who are the other members of your team,
2 people at S.S. Papadopoulos who are billing the DOJ
3 for the Camp LeJeune work? Obviously, Dr. Hennet
4 and yourself. Who else?

5 A. There are several people that I've
6 worked with. I'm not sure this is something to
7 disclose. I have to ask attorneys if this is
8 something that I can disclose.

9 Q. He didn't object, so you can answer.

10 A. That's fine. The names that I can
11 recall are Keir Soderberg, Chris Muffels, Zdravka
12 Karanovic. Off the top of my head, these are
13 people that I can think of.

14 Q. So the first one is Soderberg. How do
15 you spell that?

16 A. S-O-D-E-R-B-E-R-G.

17 Q. What's that person's job title?

18 A. He is a senior geochemist, but I don't
19 know if that falls in this category here with the
20 same title, a generic title for the rank in our
21 company.

22 Q. Next one you said Muffles?

23 A. Chris Muffels.

24 Q. How do you spell the last name?

25 A. M-U-F-F-E-L-S.

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1 Q. What the job title?

2 A. I do not recall his -- senior project
3 scientist or senior scientist. I don't recall.

4 Q. What's the next person?

5 A. Zdravka Karanovic; K-A-C-A-N-O-V-I-C,
6 same senior project, I think.

7 Q. Senior project scientist?

8 A. Yes, I think.

9 Q. Have you worked with anyone else on this
10 case?

11 A. I'm not sure I recall other names, off
12 the top of my head, right now.

13 Q. That would be invoices for work that
14 you've done related to Camp LeJeune that aren't
15 included here, right, because that would be from
16 2005?

17 MR. ANWAR: Object to form.

18 THE WITNESS: This only reflects my work
19 after, whatever, August 2022. To the extent I'm
20 included in the early ones, I don't recall the
21 exact time I start working on this. But it
22 wouldn't include any work prior to that.

23 BY MS. BAUGHMAN:

24 Q. But you did have work related to Camp
25 LeJeune prior to August 2022; right?

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1 A. I said before what my involvement in the
2 work related to Camp LeJeune was in the 2005
3 period as far as I recall.

4 Q. So that would be invoices for that work;
5 right? They would exist somewhere?

6 A. I don't know what the accounting
7 practice is for maintaining records. Possibly. I
8 don't know.

9 Q. You said that you went to -- let's try
10 to find the invoice for the trip to you said in
11 May 2024?

12 A. If I'm not mistaken. I want to say it
13 was May of 2024. Yes, that looks about right,
14 yep.

15 Q. So if you look at the invoice with the
16 last number 28, there are employee expenses right
17 related to a rental car and meals.

18 Do you see that?

19 A. Yep.

20 Q. So we can date this that your trip was
21 on May 21 and 22, 2024; correct?

22 A. Yes, around those dates 21 to 24
23 perhaps, yes.

24 Q. So if we go to the end, I see a few. At
25 least since August of 2022, it appears based on

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1 page 42 of Exhibit 7 that it says S.S. Papadopoulos
2 billed the DOJ \$2,004,131.67; correct?

3 A. If I'm reading this right, I believe,
4 yes.

5 Q. And that last bill, if you look at the
6 second to last page, that's for services rendered
7 through January 21, 2025; right?

8 A. That's what it says.

9 Q. But you've done a significant amount of
10 work in February and March 2025, haven't you?

11 MR. ANWAR: Object to form.

12 THE WITNESS: I do not recall how much
13 work I've done during that time. So I wouldn't be
14 able to characterize that as significant.

15 BY MS. BAUGHMAN:

16 Q. Well, we know that you've attended via
17 Zoom the depositions of Dr. Aral, Mr. Davis,
18 Dr. Jones and Mr. Maslia; right?

19 A. Yes.

20 Q. And you've prepared for your deposition?

21 A. Correct.

22 Q. Did you have anything to do with working
23 on going back to the site in February and then
24 doing new calculations regarding volatilization in
25 response to Dr. Sabatini's report? Were you

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1 involved in that work?

2 A. No. I was actually out of the country
3 on a different project.

4 Q. So can you tell me how much time you've
5 billed in February or March 2025 for this case?

6 A. Not off the top of my head.

7 Q. Do you keep track of your time?

8 A. We have an accounting system that we use
9 to register our working hours every week.

10 Q. So you keep track of it. Do you keep
11 track of it yourself weekly or daily? How do you
12 do it?

13 A. Daily.

14 Q. Do you write it down on paper, input it
15 somewhere? How does that work?

16 A. We have a software system where we log
17 our hours on a daily basis.

18 Q. When you log your hours, you obviously
19 say who client is that should be billed, right, in
20 the log so they know who to bill?

21 A. They're billed to a particular project
22 number.

23 Q. Do you say what you did?

24 A. It depends. Not always.

25 Q. Like, for example, if you logged hours

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1 for today, will you say, this was my time being
2 deposited, or would you just put the hours in with
3 no explanation?

4 A. I would probably put in the deposition
5 or some general description of the work that is
6 done, but not always. It's not required.

7 Q. Where is that information stored on what
8 you did on a day-to-day basis for the DOJ?

9 A. That's within our accounting system.

10 Q. And does S.S. Papadopoulos send bills to
11 DOJ that include a log of the tasks that were
12 performed?

13 A. I'm not aware of this information
14 because I do not handle that.

15 Q. Well, the file name for the document
16 that was sent to us with this was called 1817
17 Invoices through January 31, 2025, 013125, without
18 backup.pdf.

19 Do you know, what does the without
20 backup refer to?

21 A. I don't know what accounting describes
22 as such. I'm assuming that there will be
23 additional information on the project work, but I
24 don't know what that would be, notes for other.

25 Q. So you don't know whether DOJ, in

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1 addition to a bill like this, gets some kind of
2 backup that says, for example, what you did for
3 this certain amount of time in that month?

4 A. I do not recall what the files were that
5 were sent to DOJ and what they contained.

6 MS. BAUGHMAN: So I'm going to request
7 on the record that we be provided with the backup
8 information and the time tracking that tells us
9 what each person did on a day-to-day basis that
10 backs up the more than \$2 million of bills that
11 have been sent.

12 MR. ANWAR: I'm just going to note for
13 the record we responded to your request for
14 production. I believe we've produced what required
15 under rule, but we're happy to meet and confer
16 about it.

17 THE WITNESS: Just to make sure I
18 provide a complete answer on this, that our system
19 has notes. I just do not recall what was produced
20 for this and what is entailed in the other one.
21 Maybe there's more information. I will have to go
22 back and check as well.

23 BY MS. BAUGHMAN:

24 Q. In other words, internally at S.S.
25 Papadopoulos, there is information about the tasks

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1 that you've performed for the DOJ beyond how many
2 hours you billed in a given month; right?

3 A. In our system we provide notes, not
4 necessarily always, and I don't know to what
5 detail. It all depends.

6 Q. Does it depend on the client?

7 A. Or how general the description is, for
8 example. Sometimes it's not because it's work on
9 something that is a continuous task, for example,
10 so it's not necessary to log every day specific
11 details. I've never been told that there's
12 specific requirements for producing note like
13 that. This is usually for our internal purposes
14 and keeping track of the work that we do
15 sometimes, not always.

16 (Spiliotopoulos Exhibit 8 was marked.)

17 BY MS. BAUGHMAN:

18 Q. I'm handing you what I've marked as
19 Exhibit 8 to your deposition. Exhibit 8 is the
20 notice of your deposition, and then attached to
21 that is a subpoena, and then attached to that is
22 an Exhibit A that has a list of 16 different types
23 of documents that we had requested that you
24 produce to us.

25 Have you reviewed this and in particular

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1 reviewed Exhibit A?

2 A. I have reviewed this with the lawyers.

3 MR. ANWAR: For the record, we provided
4 a written response to each and every one of the
5 document requests.

6 BY MS. BAUGHMAN:

7 Q. I want to ask you some questions about
8 what kind of documents you might have in your
9 possession. So if you look at the request No. 2,
10 it ask abs materials in your possession and it
11 lists all different kinds of documents, emails,
12 memoranda, et cetera, in any way related to work
13 performed by you related in any way to Camp
14 LeJeune since 2004 to the present.

15 Do you have a working file of documents
16 that you've reviewed and you're relying on for
17 this case, for this litigation?

18 A. As part of this particular litigation, I
19 have the material that is mentioned in my expert
20 report. So I have the backup of that. I have the
21 model files.

22 Q. Anything else?

23 A. Potentially, yes, in the project
24 folders.

25 Q. What else would be in the project

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1 folders?

2 A. Notes, input files for the models,
3 things of that sort.

4 Q. Your notes?

5 A. By notes, I mean whatever goes into the
6 model, for example, for the different calculations
7 or the parameters to be used in our tests and
8 calculations as part of what is presented in this
9 expert report.

10 Q. Have you had any communications with
11 anyone, current or former employees, of the
12 Department of the Navy to form the basis of your
13 opinions?

14 A. The Department of the Navy?

15 Q. Yes.

16 A. No, I don't think so.

17 Q. Or any Marines or anyone who had worked
18 at Camp LeJeune, any communications with them?

19 A. Not that I can recall, no.

20 Q. Other than your in-person meetings?

21 A. That's the only thing I can think of.

22 Q. Number 14 asks for photographs and
23 videos taken by you or S.S. Papadopoulos related to
24 Camp LeJeune.

25 Do you have any photographs or

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1 videotapes in your possession, meaning at your
2 office or wherever it is that you work?

3 A. No. I recall receiving the photographs
4 in communication with the lawyers.

5 Q. So that means you do have them in your
6 possession?

7 A. I received them, yes.

8 Q. Did you rely photographs for your work?

9 A. For my opinions presented herein, no.

10 Q. Do you have any video of Camp LeJeune?

11 A. I don't believe so. I didn't take any
12 video. I don't know if that was any video
13 included there. I cannot recall.

14 MR. ANWAR: For the record, photographs
15 and to the extent there are videos, that's been
16 produced.

17 BY MS. BAUGHMAN:

18 Q. Other than the expert panel meeting in
19 2005, did you attend any other meeting related to
20 Camp LeJeune prior to being retained as an expert
21 witness for this litigation regarding Camp
22 LeJeune?

23 A. What type of meetings do you mean?

24 Q. Any kind of meeting related to Camp
25 LeJeune. So at some point in 2022 or 2023, you

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1 were retained as an expert in this case; right?

2 A. I do not recall the exact time I was
3 retained as an expert. I was first involved in
4 the work for Camp LeJeune for this site. I do not
5 recall the date when I was actually retained to be
6 an expert and provide an expert report on this.

7 Q. Prior to your work in 2022 or 2023
8 regarding this litigation, prior to that, did you
9 attend any other meetings related to Camp LeJeune
10 other than the 2005 expert panel?

11 A. But again that's a very general
12 question. No, I don't believe so.

13 Q. Number 16 asks about letters, emails,
14 other communications you sent or received related
15 to the National Research Council, NRC, report
16 related to Camp LeJeune, including who would be on
17 that panel and any draft of the reports.

18 Do you have any communications about
19 that?

20 A. No, I do not.

21 Q. What role did you have, if any,
22 regarding the NRC report about Camp LeJeune?

23 A. Role.

24 Q. Role. What role?

25 MR. ANWAR: Object to form.

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1 THE WITNESS: I was not involved.

2 BY MS. BAUGHMAN:

3 Q. Did you assist with identifying anyone
4 who would be on the NRC panel?

5 A. No, I did not.

6 Q. Did you assist with drafting any part of
7 the NRC report?

8 A. No.

9 Q. To your knowledge, did anyone from S.S.
10 Papadopoulos have a role in drafting the NRC
11 report?

12 A. I do not know.

13 Q. How many experts in water modeling or
14 geohydrology in your field were on NRC panel that
15 published the report about Camp LeJeune?

16 MR. ANWAR: Object to form.

17 THE WITNESS: I do not recall.

18 BY MS. BAUGHMAN:

19 Q. Dr. Clement is in your field; right?

20 A. Yes.

21 Q. Is there anyone else on the NRC panel
22 who has expertise in groundwater modeling or
23 geohydrology?

24 A. Not that I can recall, no.

25 Q. You had a statement in your report.

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1 It's on page 21, if you want to look at it. But
2 it said Dr. Clement's article you're referring to
3 the 2011 published article published in
4 Groundwater on complexities in hind cast models.
5 You said, "Dr. Clement's article echoed NRC's
6 concerns."

7 Isn't that really Dr. Clement repeating
8 his own concerns?

9 MR. ANWAR: Object to form.

10 THE WITNESS: I looked at the two
11 separately. The NRC report was a document that I
12 looked at. And Dr. Clement's paper was another
13 piece of information that I looked at. And I drew
14 that conclusion. I didn't look at the time who
15 was participating in the NRC group that provided
16 that report.

17 BY MS. BAUGHMAN:

18 Q. But as you sit here now, you recognize
19 that the only water modeling expert on NRC's panel
20 was Dr. Clement; right?

21 A. That is correct.

22 Q. That NRC report from 2009 was limited to
23 critiquing Tarawa Terrace; right?

24 A. That's my recollection, yes.

25 Q. It doesn't critique the model for Hadnot

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1 Point Holcomb Boulevard because that hadn't been
2 completed yet; right?

3 A. Yes.

4 Q. On page 21 of your report, you quote
5 from NRC, and you say that, "Per the NRC regarding
6 ATSDR using computer codes and modeling
7 techniques" --

8 A. I'm sorry. Can you point exactly where
9 you're looking at just to make sure I'm following.
10 You said page 21?

11 Q. Page 21 on the second bullet point.

12 A. Some of the modeling approaches, is that
13 correct, is that what you're looking at it?

14 Q. No. You say that, "Some of the modeling
15 approaches used by ATSDR were cutting edge,
16 meaning that they used computer codes and modeling
17 techniques that are still in the research stage."

18 Which computer codes and modeling
19 techniques are you referring to there?

20 A. First of all, that's a quote; right.

21 Q. Sure. In your opinion, which computer
22 codes and modeling techniques of ATSDR were still
23 in the research stage that they used for their
24 modeling of Tarawa Terrace?

25 MR. ANWAR: Object to form.

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1 THE WITNESS: I believe that's something
2 for the NRC to articulate.

3 BY MS. BAUGHMAN:

4 Q. Can you identify any today?

5 A. That's not part of the opinions that I
6 provide. So I don't have an opinion on that.

7 Q. You chose to put that quote in your
8 report though; right?

9 A. Well, it's a big quote. It involves
10 other things in there as well. So contextually it
11 contains what report was saying, but there's a lot
12 in there.

13 Q. But you're the one who chose to put the
14 quote in there; true?

15 A. Yes.

16 Q. Have you communicated with Dr. Clement
17 regarding Camp LeJeune?

18 A. No, I have not.

19 Q. Turn to page 18 of your report. I want
20 to focus on a statement that you have on page 18
21 toward the top of the page where you say, "ATSDR's
22 reports indicated that the Tarawa Terrace reports
23 indicated that the water modeling was intended to
24 support an epidemiological study, not for the
25 purpose of making exposure assessments in

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1 individuals."

2 Do you see that?

3 A. Yes.

4 Q. I want to then focus on the second
5 bullet point underneath that. In that bullet
6 point, you have a long quote from ATSDR Tarawa
7 Terrace Chapter A report.

8 Do you see that?

9 A. Yes.

10 Q. What you wrote there or what you quoted
11 in support of this statement you've made that
12 these modeling was for the purpose of making
13 exposure -- not for the purpose of making exposure
14 assessments in individuals, you quote, "ATSDR is
15 using water modeling techniques to provide the
16 epidemiological study with quantitative estimates
17 of monthly contaminant concentrations in finished
18 water because contaminant concentration data and
19 exposure information are limited. Results
20 obtained by using water modeling techniques along
21 with information from the mother on her water use
22 can be used by the epidemiological study to
23 estimate the level and duration of exposures to
24 the mother during her pregnancy and to the infant
25 up to one year of age."

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1 Did I read that correctly?

2 A. Yes.

3 Q. So the ATSDR stated that its water
4 modeling results can be used in combination with
5 information from the mother on her water use to
6 estimate the level and duration of her exposure to
7 these contaminants; right?

8 MR. ANWAR: Object to form.

9 THE WITNESS: No. It clearly says it
10 was to be used by the epidemiological study to
11 estimate the level and duration of exposures to
12 the mother. But there are caveats with respect to
13 that.

14 BY MS. BAUGHMAN:

15 Q. Is that a caveat right there?

16 A. This is not the only quote in my
17 opinions regarding what that did. This is just
18 one piece. You cannot take it out of context.

19 Q. Does this not say that the ATSDR's work,
20 the monthly mean concentrations can be used by the
21 epidemiological study to estimate the level and
22 duration of exposures to the mother? It says
23 that; right?

24 MR. ANWAR: Object to form.

25 THE WITNESS: Even though that is said

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1 there, Mr. Maslia has also provided responses to
2 the expert panel, for example, with respect to how
3 the results of these analyses will be used or the
4 level of detail that would be required. Then, in
5 fact, he said things like medium, high, medium,
6 low rather than actual values, detailed
7 concentrations.

8 So there is a caveat here with respect
9 to how that should be interpreted.

10 MS. BAUGHMAN: I'm going to object as
11 nonresponsive.

12 BY MS. BAUGHMAN:

13 Q. Let me ask you this: Have you reviewed
14 the published epidemiology studies regarding Camp
15 LeJeune?

16 A. I have not.

17 Q. Do you know whether in any of the
18 published epidemiology studies they document that
19 the epidemiologist used the modeling in order to
20 calculate the level and duration of exposure to
21 contaminants?

22 MR. ANWAR: Object to form.

23 BY MS. BAUGHMAN:

24 Q. Do you know whether it says that in the
25 published studies?

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1 A. No. I have not read those studies.

2 Q. Do you know if the ATSDR epidemiologists
3 actually used ATSDR modeling of the historical
4 concentration -- strike that.

5 Do you know if ATSDR epidemiologists had
6 used the mean monthly levels of contaminants
7 predicted by ATSDR's models to calculate the
8 cumulative exposure for any individuals who lived
9 at Camp LeJeune?

10 MR. ANWAR: Object to form.

11 THE WITNESS: I do not know that. I'm
12 not familiar with the epidemiological studies at
13 Camp LeJeune.

14 BY MS. BAUGHMAN:

15 Q. So if the modeling was sent to support
16 the epidemiology studies and the epidemiologists
17 used the modeling to calculate cumulative exposure
18 to individuals, you don't know that; right?

19 MR. ANWAR: Object to form, foundation.

20 THE WITNESS: My work here is only to
21 critique the quality of the modeling work and
22 outcome of that modeling.

23 BY MS. BAUGHMAN:

24 Q. So you don't know whether ATSDR's work
25 was used for the purpose of making exposure

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1 assessments in individuals? You don't know either
2 way, do you?

3 MR. ANWAR: Object to form and
4 foundation.

5 BY MS. BAUGHMAN:

6 Q. By the ATSDR epidemiologists. Do you
7 know?

8 A. This is irrelevant to my opinions on
9 this matter.

10 MS. BAUGHMAN: I'm going to object as
11 nonresponsive.

12 BY MS. BAUGHMAN:

13 Q. Page 23 of your report, you chose to put
14 in your report a statement about this work being
15 to support and epidemiologic study and not for
16 purpose of making exposure assessments in
17 individuals. You included that in your report;
18 right?

19 A. I included that in my report because it
20 provides context with respect to how this work was
21 done, what it was intended to do, what the
22 timeframe of that was and, therefore, support my
23 work in looking at whether the modeling work that
24 was done provided good results to rely on and
25 support such evaluations.

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1 Q. Can you tell me whether or not the ATSDR
2 epidemiologist used the ATSDR's mean monthly
3 concentrations from the modeling in order to make
4 exposure assessments in individuals? Do you know
5 whether they did that? Yes or no.

6 MR. ANWAR: Object to form and
7 foundation.

8 THE WITNESS: I do not know that, but
9 it's not relevant to work that I did and the
10 opinions that I provide.

11 MS. BAUGHMAN: I'll object as
12 nonresponsive to everything after "I do not know
13 that."

14 BY MS. BAUGHMAN:

15 Q. Did you do any research to determine how
16 ATSDR's modeling studies were used by the
17 epidemiologists?

18 A. That was not my role in this case.

19 Q. Your report at 25 on a similar subject
20 here, the last sentence on the first paragraph,
21 you've written, "ATSDR further acknowledged this
22 uncertainty by stating," quote, "'ATSDR's exposure
23 assessment cannot be used to determine whether you
24 or your family suffered any health effects as a
25 result of past exposures to contaminated water at

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1 Camp LeJeune. '"

2 You put that quote in your report;
3 right?

4 A. Yes.

5 Q. And you're citing there two documents
6 including ATSDR had Hadnot Point Chapter A; right?

7 A. Looks about right.

8 Q. Yes?

9 A. Yes.

10 (Spiliotopoulos Exhibit 9 was marked.)

11 BY MS. BAUGHMAN:

12 Q. I'm handing you what's marked as
13 Exhibit 9 to your deposition, which is Chapter A,
14 Summary and Findings from Hadnot Point. That's
15 the document that you cited there; correct?

16 A. Yes.

17 Q. Let's turn to the page you cited page
18 A182. The very first sentence under the bolded
19 statement is your quote, right, what you quoted?
20 But you left out a word, didn't you? What the
21 ATSDR wrote was "ATSDR's exposure estimates cannot
22 be used alone to determine whether you or your
23 family suffered any health effects as a result of
24 past exposure to TCE contaminated drinking water
25 at U.S. Military Base Camp LeJeune." Right?

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1 MR. ANWAR: Object to form.

2 BY MS. BAUGHMAN:

3 Q. That's what it says in the document
4 right? Is that true?

5 Did I read that correctly?

6 A. This is correct, yes. That was --

7 Q. Cannot be used alone.

8 A. Yeah. That's what's in there, that is
9 correct.

10 Q. In your report, you have that quote, but
11 you left out the word "alone," didn't you?

12 A. That was an omission on my part. Yes, I
13 didn't realize that.

14 MR. ANWAR: Object to form. There are
15 two documents cited there.

16 THE WITNESS: Exactly. The first one
17 where I took the quote from was the Tarawa Terrace
18 one. And in looking at that and in looking at
19 this, it seemed to me like it was exactly the same
20 statement.

21 BY MS. BAUGHMAN:

22 Q. It's a misrepresentation to leave out
23 the word "alone," isn't it?

24 MR. ANWAR: Object to form.

25 THE WITNESS: Well, in the first

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1 statement, that word was not there. In the
2 statement Tarawa Terrace modeling was not there.

3 BY MS. BAUGHMAN:

4 Q. You had sent a letter to us saying that
5 we should limit objections to "Objection. Form."
6 Your last objection was a statement and coaching
7 of the witness. Don't do it again or we'll write
8 a letter back and we'll bring it up with the
9 judge.

10 MR. ANWAR: Noted.

11 MS. BAUGHMAN: You cannot tell him about
12 two statements or if it's in another document.
13 That's coaching the witness. You just coached the
14 witness on record.

15 MR. ANWAR: I'm not coaching the
16 witness.

17 MS. BAUGHMAN: Don't do it again.

18 MR. ANWAR: I'm not.

19 THE WITNESS: This is an exhibit?

20 BY MS. BAUGHMAN:

21 Q. Yes. It goes in the pile.

22 You're aware that the Tarawa Terrace and
23 the Hadnot Point Holcomb Boulevard models have
24 been peer reviewed; right?

25 MR. ANWAR: Object to form.

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1 THE WITNESS: The Tarawa Terrace model
2 has been reviewed. I don't believe that the
3 Hadnot Point model has been reviewed.

4 BY MS. BAUGHMAN:

5 Q. We're talking about peer review, not
6 just review. So you're saying only Tarawa Terrace
7 has been peer reviewed; is that right?

8 A. I do not recall seeing a peer review of
9 the Hadnot Point model, but you can show me where
10 that is.

11 Q. We're going to get back to it. Let me
12 go back to something else. I forgot one thing.
13 Let's go back to page 26 of your report.

14 We were talking about what Mr. Maslia
15 said or didn't say about -- I'm sorry -- not your
16 report.

17 (Spiliotopoulos Exhibit 10 was marked.)

18 BY MS. BAUGHMAN:

19 Q. I'm marking as Exhibit 10 the expert
20 report of Morris Maslia from October of 2024.

21 You've reviewed that document; right?

22 A. Yes. I've read it.

23 Q. And you said that when you -- part of
24 the reason you included these statements in your
25 report about what the intent was of doing the

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1 modeling or how it was going to be used is you
2 were relying on what Mr. Maslia had said about
3 that; right? You had mentioned something about
4 that?

5 A. I mentioned that there are several
6 quotes by Mr. Maslia at different times including
7 his depositions, the ATSDR reports, his expert
8 report and so on, regarding this subject.

9 Q. Turn to page 26 of Mr. Maslia's
10 October 2024 expert report under the heading 7.3,
11 Water Modeling and Study Objectives. Do you see
12 that?

13 A. Yes.

14 Q. And Mr. Maslia says there, "When ATSDR
15 health study epidemiologists requested scientific
16 and technical support from the exposure dose
17 program, they presented a list of the five
18 objectives and questions that they wanted to
19 achieve an answer."

20 So the epidemiologists presented this
21 list to Mr. Maslia and his team; correct?

22 MR. ANWAR: Object to form.

23 BY MS. BAUGHMAN:

24 Q. Is that right?

25 A. That's what it says.

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1 Q. It says that that these five objectives
2 and questions were originally presented at a
3 meeting held on October 28, 2023 at ATSDR's
4 headquarters in Chamblee, Georgia with attendance
5 by ATSDR, Department of the Navy, Naval Facilities
6 Engineering command staff, and the ATSDR
7 university partner and contractors.

8 I left out some parentheticals, but
9 that's what it says; correct?

10 A. Correct.

11 Q. Then it lists the five study objectives
12 and questions that the epidemiologists asked ATSDR
13 to address; correct?

14 A. Yes.

15 Q. And those include what were the mean
16 monthly drinking water concentrations; correct?

17 A. Yes.

18 Q. That's the third one. But the first one
19 is what chemical compounds contaminated the
20 drinking water and where did they come from.
21 Right?

22 A. Correct.

23 Q. The second one is when did contaminated
24 groundwater reach water supply wells and what was
25 the duration of the contamination. Correct?

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1 A. Correct.

2 Q. Let me ask you a question about that.
3 You've done a lot of work, and you've written a
4 report that's about a hundred pages on this
5 subject matter; correct?

6 A. Yes.

7 Q. Do you have an opinion about when any
8 contaminant reached a water supply well at Tarawa
9 Terrace or Hadnot Point? Had you offered those
10 opinions?

11 A. My opinions critiqued the estimates
12 provided by ATSDR on the basis of poor
13 calibration, poor model construction, and lots of
14 assumptions that cannot be tested as well as the
15 accuracy of the model results.

16 MS. BAUGHMAN: I'll object as
17 nonresponsive.

18 BY MS. BAUGHMAN:

19 Q. Try answering my question. If the
20 answers is no, that's fine.

21 Do you have an opinion for the court,
22 for the four judges in this case, about when any
23 contaminant in groundwater reached any water
24 supply well at Tarawa Terrace or Hadnot Point?

25 A. I did not offer an opinion that would

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1 pinpoint a date or a timeframe for that to happen.

2 Q. Do you have an opinion that you can
3 provide to any of the judges that are addressing
4 this case on when any contaminant in
5 groundwater -- strike that.

6 Do you have an opinion that you can
7 provide the court in this case about the duration
8 of contamination for any contaminant that
9 contaminated a water supply well at Tarawa Terrace
10 or Hadnot Point? In other words, how long did it
11 contaminate the well?

12 MR. ANWAR: Object to form.

13 BY MS. BAUGHMAN:

14 Q. Do you have any opinions like that?

15 A. My opinions actually suggest that it is
16 not possible with any kind of certainty to answer
17 that question.

18 Q. So you don't have an answer?

19 A. I only know what the data suggests with
20 respect to when we know the contamination was
21 there, but with respect to when it arrived there
22 or at what level, I don't think it's possible to
23 provide that answer with any kind of certainty.

24 Q. With any kind of certainty. Okay.

25 The next question that Mr. Maslia

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1 addresses is what were mean monthly drinking water
2 concentrations? Do you have an opinion for the
3 court in this case as to what a mean monthly
4 drinking water concentration was for any
5 contaminant at Tarawa Terrace or Hadnot Point
6 water treatment plant at any point in time?

7 A. Prior to the dates for which data are
8 available, it is not possible to do that at all.
9 And even within the timeframe for which data were
10 available, and I'm talking about the period up to
11 1985 for starters, this is also not possible to be
12 done with any kind of certainty estimates.

13 Q. So you're not going to offer in this
14 case to the court an opinion as to what the mean
15 monthly drinking water concentration was for any
16 month or at any point in time at the Tarawa
17 Terrace or Hadnot Point water treatment plant;
18 right? You're not offering those opinions, are
19 you?

20 A. The only opinion that I'm offering is
21 that we have data for the months for which we can
22 say what kind of contamination we had in the
23 treatment system, but for the other months, I'm
24 saying that we cannot know with any kind of
25 certainty.

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1 Q. Have you performed modeling to try to
2 answer the question yourself?

3 A. I've only performed modeling to test the
4 ATSDR models for their accuracy.

5 Q. You haven't tried to do it yourself?

6 A. No. In fact, my opinion suggests with
7 the data available, it is not possible to do that.

8 Q. So let's go back to the peer review.
9 There were two expert peer-review panels, right,
10 that were conducted regarding ATSDR's modeling
11 work; right?

12 A. Yes.

13 Q. You attended one of them; right?

14 A. Correct.

15 Q. Why didn't you attend the other one?

16 A. I was not asked to do at the time,
17 something like that. I was not involved in the
18 project otherwise.

19 Q. Just to guide our discussion, if you
20 could turn to Mr. Maslia's report, which we've
21 marked as Exhibit 10, on page 99 there is a
22 section in his report called Peer Review of ATSDR
23 Analyses, Results and Reports.

24 Do you see that?

25 A. Yes.

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1 Q. So I want to talk about five different
2 kinds of peer review. First, there were two
3 expert peer-review panels that looked at the
4 modeling work of ATSDR and reviewed it in 2005 and
5 in 2009; correct?

6 A. In 2005 the expert panel reviewed the
7 preliminary work and approaches that ATSDR offered
8 for doing this work. In 2009, I believe there
9 were some discussion with respect to the findings
10 based on the model, the ATSDR model for Tarawa
11 Terrace. I think the discussion after that was
12 for the approaches proposed for the Hadnot Point
13 model. At the time, they didn't review the Hadnot
14 Point model.

15 Q. So in 2005, they discussed methodology
16 and approaches being used for the model of Tarawa
17 Terrace; right?

18 A. That is correct.

19 Q. And the experts provided feedback, and
20 ATSDR considered that feedback and, in fact, wrote
21 a report about the panel and what they were going
22 to do as a result; correct?

23 MR. ANWAR: Object to form and
24 foundation.

25 THE WITNESS: They offered comments and

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1 opinions on what was preliminary work at the time,
2 and I believe it was primarily or mostly related
3 to the groundwater flow model, not the transport
4 model because it was not available at the time.
5 They discussed in 2005 approaches on how to go
6 about performing the transport modeling.

7 BY MS. BAUGHMAN:

8 Q. ATSDR took that advice under advisement
9 and wrote a report about that panel meeting;
10 right?

11 A. It was a report that summarized the
12 discussions, comments and recommendations.

13 Q. And then four years later. ATSDR got
14 another panel, expert panel together and talked
15 more about their methodologies and their
16 approaches, presented Tawara Terrace results and
17 talked about their approach for Hadnot Point;
18 right?

19 MR. ANWAR: Object to form.

20 THE WITNESS: I'm not sure at the time
21 what the panel reviewed with respect to the work
22 that was done in terms of reports, model files and
23 things like that. So I'm not sure what exactly
24 they looked at.

25

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1 BY MS. BAUGHMAN:

2 Q. Just to be clear, you weren't at the
3 2009 panel; right?

4 A. No, I was not.

5 Q. Did you read those two days of
6 testimony, of remarks?

7 A. I reviewed some of that, but not in
8 detail word by word.

9 Q. Did you review the report that was
10 written about the two-day meeting in 2009?

11 A. Again, I reviewed that to some extent,
12 yes.

13 Q. Not all the way through?

14 A. I can't recall if I reviewed every --
15 because it involved many different things, some of
16 which were not within the scope of the work that I
17 was doing.

18 Q. So Mr. Maslia wrote in the middle of
19 that first paragraph on page 99, he said, "The
20 panels were composed of nationally and
21 internationally recognized experts with
22 professional backgrounds in government, academia
23 and the private sector."

24 Do you agree with that?

25 MR. ANWAR: Object to form.

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1 THE WITNESS: That's his opinion on the
2 status of the person.

3 BY MS. BAUGHMAN:

4 Q. What's your opinion?

5 A. I do not have one.

6 Q. You don't know the reputations of the
7 experts that were on those two panels?

8 MR. ANWAR: Object to form and
9 foundation.

10 THE WITNESS: I know of them, but I
11 don't think I can form an opinion on how that they
12 are, their work in general. I know some of them
13 or all of them, but that's as far as I would go.

14 BY MS. BAUGHMAN:

15 Q. So as part of your work on this case,
16 you didn't say it was important to look at who was
17 on these expert panels and whether they were
18 qualified to provide opinions to ATSDR on the
19 methodologies?

20 MR. ANWAR: Object to form and
21 foundation.

22 BY MS. BAUGHMAN:

23 Q. That wasn't part of your work?

24 MR. ANWAR: Same objection.

25 THE WITNESS: I think what is important

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1 to know is what they reviewed and how. I'm not
2 even sure that they went into the detail of the
3 review that I performed on this modeling work to
4 offer my opinions on this.

5 MS. BAUGHMAN: Let me start with I'm
6 going to object as nonresponsive.

7 BY MS. BAUGHMAN:

8 Q. Did you as part of your work on this
9 case look into the qualifications and backgrounds
10 of the panelists who were on the two expert
11 peer-review panels for ATSDR?

12 A. I know a few of the people on those
13 panels, and I respect their reputation in the
14 field. But, like I said, I do not know what they
15 reviewed to come to their conclusions and
16 recommendations or comments.

17 Q. So you know a few of the people in the
18 field and you respect them, but you didn't look at
19 the qualifications of all of the expert panelists;
20 is that fair?

21 MR. ANWAR: Object to form.

22 THE WITNESS: I don't think that it's
23 relevant to the work that I'm doing here with
24 respect to the level of detail that I looked into
25 these models. Like I said, unless I knew what

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1 exactly they looked at and we could have a
2 conversation face to face on these issues, I
3 cannot offer an opinion on what kind of comments
4 they produced.

5 MS. BAUGHMAN: I'm going to object as
6 nonresponsive.

7 BY MS. BAUGHMAN:

8 Q. Whether you think something is relevant
9 or not actually doesn't matter. You're required
10 to answer my questions whether you think it's
11 relevant or not.

12 So let me ask this question again. Did
13 you look into the qualifications and background of
14 each of the expert panelists that were on the 2005
15 and 2009 panels for ATSDR? Did you do it or not?

16 MR. ANWAR: Object to form.

17 THE WITNESS: I know most of the people
18 there as members of the scientific community in
19 our field, and I know their reputation and their
20 qualifications.

21 BY MS. BAUGHMAN:

22 Q. And they're qualified, aren't they?

23 MR. ANWAR: Object to form and
24 foundation.

25 THE WITNESS: This is a very general

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1 description to provide. I think they're good
2 practitioners or researchers in the field. But
3 this is not relevant to whether they formed an
4 opinion based on facts similar to those that I
5 looked at. So that's important with respect to
6 the opinion they provided there.

7 BY MS. BAUGHMAN:

8 Q. What materials did ATSDR provide to the
9 panelists in advance of the 2005 panel?

10 A. I do not know.

11 Q. What materials did ATSDR provide to the
12 panelists in advance of the 2009 panel?

13 A. I do not know.

14 Q. You know it's documented in the reports
15 what they were provided. You just didn't look,
16 did you?

17 MR. ANWAR: Object to form.

18 THE WITNESS: I'm not sure I recall, but
19 I do not think that the actual model files and
20 especially the final model files were provided,
21 but I can't be sure. And I don't know to what
22 level of detail the panel looked at these files
23 and formed opinions.

24 BY MS. BAUGHMAN:

25 Q. Did you attempt to find out what the

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1 panelist members reviewed prior to meeting in 2005
2 or 2009?

3 MR. ANWAR: Object to form.

4 THE WITNESS: I'm sorry. Can you repeat
5 the question?

6 BY MS. BAUGHMAN:

7 Q. Did you do any research or did you read
8 any documents to try to determine what the
9 panelists were provided to review prior to the
10 2005 and 2009 meetings?

11 MR. ANWAR: Same objection.

12 THE WITNESS: No, because it was not
13 relevant to the work that I was doing. It's
14 performed an independent evaluation.

15 MS. BAUGHMAN: I'm going to object as
16 nonresponsive to everything after "no."

17 BY MS. BAUGHMAN:

18 Q. Now, let's go to the next level of
19 review. The second paragraph of Mr. Maslia's
20 report says under the section of peer review on
21 page 99, says "In addition to the expert panels
22 and implementing their recommendations, ATSDR
23 sought out independent external peer review for
24 every chapter report for the Tawara Terrace,
25 Hadnot Point, Holcomb Boulevard reports. These

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1 peer reviewers were subject matter experts in all
2 topics covered by the ATSDR historical
3 reconstruction analysis reports."

4 Did I read that correctly?

5 A. You read that correctly, yes.

6 Q. Now, were you aware that each chapter of
7 Tawara Terrace and Hadnot Point, Holcomb Boulevard
8 received independent external peer review?

9 A. I don't see any reference here as to who
10 these people were and what work they did. So I
11 don't know.

12 Q. Were you aware -- this is my question --
13 that each chapter was independently externally
14 peer reviewed? Were you aware of that?

15 A. Not other than what I'm reading here.

16 Q. Are you aware that as part of the file
17 that's been produced in this case actually by the
18 Department of Justice, there are documents
19 documenting the peer review and the comments and
20 the responses regarding every chapter? Did you
21 review those documents?

22 MR. ANWAR: Object to form.

23 THE WITNESS: I only performed an
24 independent evaluation of the work done by the
25 ATSDR.

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1 MS. BAUGHMAN: I object as
2 nonresponsive.

3 BY MS. BAUGHMAN:

4 Q. Here's my question. Did you review the
5 documents regarding the external peer review of
6 the every chapter of the Tawara Terrace and Hadnot
7 Point, Holcomb Boulevard reports? Did you review
8 those peer-review comments and responses?

9 MR. ANWAR: Object to form.

10 THE WITNESS: You will have to present
11 me with these documents, and I can tell you if I
12 reviewed them or not. I cannot recall, off the
13 top of my head, if something I reviewed was
14 relevant to your question.

15 BY MS. BAUGHMAN:

16 Q. Do you recall at this point having
17 reviewed the peer-review comments of the chapters
18 at Hadnot Point and Holcomb Boulevard and Tawara
19 Terrace from the independent external peer review?

20 Do you recall reviewing those documents?

21 MR. ANWAR: Object to form.

22 THE WITNESS: You're referring to the
23 external peer review mentioned in that paragraph?

24 BY MS. BAUGHMAN:

25 Q. Yes.

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1 A. I do not recall off the top of my head.

2 Q. You don't. Okay.

3 Do you know whether the individuals who
4 did that independent external peer review of each
5 chapter, do you know whether they were subject
6 matter experts in the topics covered by the ATSDR
7 historical reconstruction reports?

8 A. You will have to tell me who these
9 people were so I can tell you more about it.

10 Q. You did review Mr. Maslia's report;
11 right?

12 A. Yes.

13 Q. And you saw that he said that each
14 chapter is externally peer reviewed; right?

15 A. Yes.

16 Q. Did you look into that any further?

17 A. It was not necessary.

18 Q. So let's talk about the third level of
19 peer review. You're aware that Mr. Maslia and his
20 colleagues published in peer-reviewed journals
21 articles regarding the modeling of both Tawara
22 Terrace and Hadnot Point; right?

23 MR. ANWAR: Object to form.

24 THE WITNESS: I have seen publications
25 to that effect, yes.

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1 BY MS. BAUGHMAN:

2 Q. So in 2009 in the journal Water Quality
3 Exposure and Health, Mr. Maslia published an
4 article about his modeling of Tarawa Terrace
5 called Reconstructing Historical Exposures to
6 Volatile Organic Compound Contaminated Drinking
7 Water at a U.S. Military Base. Correct?

8 A. Yes.

9 Q. That's a peer-reviewed journal?

10 A. Yes.

11 MR. ANWAR: Object to form.

12 BY MS. BAUGHMAN:

13 Q. Then in 2016, Mr. Maslia published in
14 the journal Water regarding Hadnot Point and
15 Holcomb Boulevard in an article entitled
16 "Reconstructing Historical VOC Concentrations in
17 Drinking Water for Epidemiologic Studies at a
18 Military Base: Summary of Results." Correct?

19 A. It appears so, yes.

20 Q. That's also a peer-reviewed journal;
21 right?

22 MR. ANWAR: Object to form.

23 THE WITNESS: Well, peer review is with
24 respect to what the paper states and the
25 approaches and results. But unless you look at

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1 how the calculations are performed and the details
2 of how the analysis is done, I don't know that you
3 can offer an opinion to that effect.

4 MS. BAUGHMAN: I'm going to object as
5 nonresponsive.

6 BY MS. BAUGHMAN:

7 Q. There's a peer-review process for
8 publishing articles in literature; right?

9 A. That does not include necessarily look
10 at the actual model files and looking in details
11 on what is presented in the papers.

12 MS. BAUGHMAN: I'm going to object as
13 nonresponsive.

14 BY MS. BAUGHMAN:

15 Q. I didn't ask you that. That's not what
16 I asked you.

17 There is a peer-review process. There
18 is a process to publish in the peer-reviewed
19 literature; right?

20 MR. ANWAR: Object to form.

21 THE WITNESS: My response to your
22 question is yes, but that peer review rarely, if
23 not ever, includes reviewing the actual
24 calculations and the context of those
25 calculations. It looks at the methods and the

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1 results.

2 MS. BAUGHMAN: I'm going to object as
3 nonresponsive to everything after "yes."

4 BY MS. BAUGHMAN:

5 Q. So you've published in your career a
6 total of two articles in the peer-reviewed
7 literature; right?

8 MR. ANWAR: Object to form.

9 THE WITNESS: Yes.

10 BY MS. BAUGHMAN:

11 Q. You've never been asked to be a peer
12 reviewer of anyone else's article in the
13 peer-reviewed literature; right?

14 A. I have 20 years in the field working on
15 very complex problems.

16 Q. How many articles were you asked to peer
17 review in the literature in your field, how many?

18 A. I'm not sure how that is relevant to
19 anything.

20 Q. What's the answer to the question?

21 A. I believe you said before it's two
22 articles I have in peer review.

23 Q. No. How many times have you been asked
24 to review someone else's before it's published in
25 the peer-reviewed literature?

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1 A. I have not been involved in that
2 process.

3 Q. I didn't think so.

4 So you don't know what the peer
5 reviewers of Mr. Maslia's two published
6 peer-reviewed articles looked at in order to agree
7 that those articles should be published? You
8 don't know that, do you?

9 MR. ANWAR: Object to form.

10 THE WITNESS: You're asking me whether
11 they have reviewed model files and things like
12 that?

13 BY MS. BAUGHMAN:

14 Q. Dr. Spilotopoulos, I'm asking you: You
15 don't know what they did or didn't review, do you?

16 A. I am familiar with the review process in
17 peer-reviewed journals. And to my experience and
18 knowledge, almost I would say never, but I want to
19 reserve the right to maybe be wrong in some cases,
20 but that is never done.

21 MS. BAUGHMAN: I object as
22 nonresponsive.

23 BY MS. BAUGHMAN:

24 Q. I didn't ask about a specific type of
25 document. I'm asking: Do you know what the peer

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1 reviewers reviewed before agreeing that
2 Mr. Maslia's article on Hadnot Point modeling
3 could be published in Water in 2016? Do you know
4 what they reviewed?

5 MR. ANWAR: Object to form.

6 THE WITNESS: I don't know what they
7 reviewed, but it would still not impact my
8 opinion.

9 MS. BAUGHMAN: I'm going to object as
10 nonresponsive to everything after "I don't know
11 what they reviewed."

12 BY MS. BAUGHMAN:

13 Q. Fourth, Mr. Maslia and his peers have
14 presented their modeling work at multiple
15 professional conferences, haven't they? Are you
16 aware of that?

17 A. That seems right. I don't know what the
18 actual number is, but, yes, they have done that.

19 Q. Just like you've gone to conferences
20 and, for example, talked about their Hanford work,
21 they've gone to work and presented their work
22 regarding modeling methodologies; right?

23 A. That is correct.

24 Q. And you view that as a form of peer
25 review. You told me that earlier; right?

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ALEXANDROS SPILIOTOPOULOS, PH.D.

1 A. These conferences and presentations
2 provide a forum for people to present their work,
3 and it stimulates conversation regarding that
4 work. Peer review for the conferences that I have
5 participated, similar to those that you referred
6 to regarding Mr. Maslia and the ATSDR group, they
7 review the paper that you provide if that's
8 necessary and required. In many cases it's a
9 presentation that is not even reviewed. But where
10 it is reviewed, the paper itself is reviewed with
11 respect to how it presents the work, not
12 necessarily what goes behind the calculations that
13 are presented there, whether they're correct or
14 not.

15 This is part of the conversation that
16 the paper and presentations stimulate in the
17 presentation.

18 Q. And what you just said applies to each
19 of the conferences where you've presented your
20 work to; right?

21 A. That is correct.

22 Q. It's not really a true peer review, is
23 it?

24 MR. ANWAR: Object to form.

25 THE WITNESS: It's the type of peer

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ALEXANDROS SPILIOTOPOULOS, PH.D.

1 review that I just described.

2 BY MS. BAUGHMAN:

3 Q. You didn't cite either of Mr. Maslia's
4 published peer-reviewed articles regarding the
5 modeling work for Tawara Terrace or Hadnot Point
6 in your report, did you?

7 MR. ANWAR: Object to form.

8 THE WITNESS: I'm not sure. I have to
9 check.

10 BY MS. BAUGHMAN:

11 Q. We just checked. It's not cited in your
12 footnotes, and it's not in your up-to-date
13 Supplemental and Corrected Reliance List. It's
14 not on either one. Does that surprise you?

15 A. In what sense? I'm not sure I'm
16 following your question.

17 Q. Is there a reason why the two published
18 peer-reviewed articles of Mr. Maslia from 2009 and
19 2016 regarding his work at Camp LeJeune are not
20 cited in your report or in your Supplemental and
21 Amended Reliance List?

22 A. Because the work that I did relied on
23 the modeling files provided in support of the
24 ATSDR reports. That's all I needed to look at.

25 Q. Did you actually review what Mr. Maslia

GOLKOW TECHNOLOGIES

ALEXANDROS SPILIOTOPOULOS, PH.D.

1 published in 2009 and 2016 regarding his modeling?

2 A. I'm not sure that I did. I do not
3 recall.

4 Q. You don't recall reading those articles?

5 A. Off the top of my head, I'm not sure
6 that I did.

7 Q. If you had read them, you would have
8 included them on your Supplemental and Amended
9 Reliance List, right, as something you considered?

10 A. I would think so.

11 Q. So you didn't consider them?

12 A. I'm saying that I do not recall them
13 and, therefore, they were not there. But I'm not
14 sure even that I did, and I don't think that I
15 would forget to include them there.

16 Q. Right. So based on what you know about
17 your methodology, have you reviewed Mr. Maslia's
18 two published peer-reviewed articles on the
19 modeling done for Tawara Terrace and Hadnot Point,
20 you would have put it on your Supplemental and
21 Amended Reliance List; right?

22 MR. ANWAR: Object to form.

23 THE WITNESS: I'm sorry. You mentioned
24 in the beginning of your question based on my
25 methodology?

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ALEXANDROS SPILIOTOPOULOS, PH.D.

1 BY MS. BAUGHMAN:

2 Q. Yeah. Based on your ordinary practice,
3 if you review something, you put it on the list;
4 right? Isn't that what you did?

5 A. Hopefully without forgetting to include
6 something just because it slipped my mind.

7 Q. You told me if you were provided
8 something by the lawyers, you'd put it on your
9 list even if you didn't review it; right?

10 A. That would be the case in general, yes.

11 Q. So I guess the lawyers didn't provide
12 you with Mr. Maslia's peer-reviewed articles, and
13 you didn't go out and find them, and you didn't
14 review them for your work on this case; right?

15 MR. ANWAR: Object to form and
16 foundation.

17 THE WITNESS: I'm not sure if they were
18 provided, if I reviewed them. That I certainly
19 don't recall. But again for my work, they were
20 not necessary.

21 BY MS. BAUGHMAN:

22 Q. So based on your sworn testimony today,
23 you do not recall ever having reviewed
24 Mr. Maslia's 2009 or 2016 published peer-reviewed
25 articles regarding his modeling at Tawara Terrace

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ALEXANDROS SPILIOTOPOULOS, PH.D.

1 and Hadnot Point; right?

2 MR. ANWAR: Object to form and
3 foundation.

4 THE WITNESS: Again, I do not recall. I
5 honestly do not recall.

6 BY MS. BAUGHMAN:

7 Q. You can't recall having reviewed them;
8 right?

9 A. I cannot recall.

10 Q. Are you saying you can't either way, or
11 you don't recall having reviewed them?

12 A. I do not recall having reviewed them.
13 Whether I did or not, like I said, I do not
14 recall.

15 Q. And to the extent you did review them,
16 you have no explanation for me as to why they're
17 not on your Supplemental and Amended Reliance
18 List; right?

19 A. I think I was very clear. I do not
20 recall if I did. If I did and they wouldn't be
21 there, would that be omission? I don't know. I
22 do not recall.

23 Q. Did you purposely leave Mr. Maslia's two
24 published peer-reviewed articles on his modeling
25 at Tawara Terrace and Hadnot Point off of your

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1 list? Did you do that on purpose?

2 MR. ANWAR: Object to form.

3 THE WITNESS: I'm telling you I do not
4 even recall reviewing them. So I don't understand
5 how I could have intentionally omitted them.

6 BY MS. BAUGHMAN:

7 Q. The last thing I want to point out, are
8 you aware that ATSDR's modeling team received an
9 award from the American Academy of Environmental
10 Engineers and Scientists for their modeling work
11 regarding Camp LeJeune? Are you aware of that?

12 A. I am aware of that.

13 Q. In 2015 they received the Excellence in
14 Environmental Engineering Award, grand prize, for
15 the research category from the American Academy of
16 Environmental Engineers and Scientists; correct?

17 A. Yes. I do know that. But like I said
18 before, I don't know whether that was on the merit
19 of developing a novel approach to doing things
20 versus whether the applicability of that method is
21 reliable for the purposes, the intended purposes
22 of this study. These are two different things.

23 Q. You're aware they got the grand prize
24 award in 2015; right?

25 A. Yes.

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ALEXANDROS SPILIOTOPOULOS, PH.D.

1 Q. Have you ever gotten a grand prize award
2 for any of your work?

3 MR. ANWAR: Object to form.

4 THE WITNESS: No, I have not.

5 BY MS. BAUGHMAN:

6 Q. Do you know what the criteria were for
7 receiving the grand prize award from the American
8 Academy of Environmental Engineers and Scientists?

9 THE WITNESS: I do not.

10 BY MS. BAUGHMAN:

11 Q. Did you look into it?

12 A. No, I did not.

13 Q. Are you a member of that organization?

14 A. I am not.

15 Excuse me, ma'am. How long have we been
16 going on in this session? I don't know if it's
17 time for a short break.

18 Q. If you want a break, we can take a
19 break.

20 A. Five minutes.

21 THE VIDEOGRAPHER: Off the record at
22 1447.

23 (Recess from 2:47 p.m. to 3:00 p.m.)

24 THE VIDEOGRAPHER: On the record at
25 1500.

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1 THE WITNESS: Before we begin, I would
2 like to go back to your question. I believe you
3 asked me whether I can or will offer an opinion
4 regarding the timing of contamination reaching the
5 wells in Tawara Terrace or Hadnot Point.

6 My complete answer to that is I do not
7 believe that the current model can do this, but I
8 can have an opinion on the likelihood for
9 contamination to reach in those wells without
10 having a certain date, but certainly a timeframe.

11 BY MS. BAUGHMAN:

12 Q. In your expert report, is there an
13 opinion that states when a contamination, any
14 contamination would reach any well at Tawara
15 Terrace or Hadnot Point?

16 A. My expert report focused solely on the
17 critiquing the model. So it was only focused on
18 that.

19 MS. BAUGHMAN: Objection.
20 Nonresponsive.

21 BY MS. BAUGHMAN:

22 Q. I'm asking you in your expert report, is
23 there an opinion that tells us the timing of when
24 contamination of any contaminant reached or would
25 reach any well at Tawara Terrace or Hadnot Point?

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1 Is that opinion in your report?

2 A. I do not have a formal opinion in that
3 respect.

4 Q. You didn't cover that in your expert
5 report; right?

6 A. Explicitly, no.

7 Q. Or even implicitly. I mean, if you can
8 show me where in your report you provided the
9 opinion on the timing of when contamination would
10 reach any well at Tawara Terrace or Hadnot Point,
11 I want to see where that is.

12 A. I do not have an explicit opinion like
13 that. I state facts and data, but there is
14 additional things that I have thought and
15 considered during this process of depositions and
16 other things that I looked at that can help me
17 form another opinion potentially on that.

18 Q. Understood. But you understand that the
19 process in federal court is that if you have an
20 opinion you're going to offer the court, it's
21 supposed to be in your expert report; right?

22 A. That is correct, although I never had
23 the benefit of rebuttal of -- the rebuttals of the
24 plaintiffs' expert. Therefore, I'm a little
25 shortchanged in that respect.

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ALEXANDROS SPILIOTOPOULOS, PH.D.

1 Q. I asked you about the water wells. I
2 want to ask you about the water treatment plants.
3 In your report, you haven't offered any opinion as
4 to when contamination reached the water treatment
5 plant initially for Tawara Terrace or Hadnot Point
6 water treatment plants, have you?

7 A. No. That falls squarely in what I said
8 before about the wells and the treatment plant.
9 So that's an opinion I can offer.

10 Q. That is not in your report?

11 A. That is not currently explicitly in my
12 report.

13 Q. Well, you say explicitly in your report.
14 It's not implicitly report either; right? When I
15 say that, if it's in your report, I want you to
16 show me what page it is where you've offered the
17 opinion where any contamination reached any well
18 or the water treatment plant?

19 A. By implication I mean I provide opinions
20 and facts regarding when contamination was found,
21 what data suggests that, for example,
22 nondetections were there and the model, for
23 example, falsely ignored them and provided
24 elevated concentrations at the same time. So all
25 this can inform an opinion as to when

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1 contamination could have arrived.

2 Q. But that opinion is not stated in your
3 report; fair?

4 A. That is correct.

5 Q. We talked about this in Mr. Maslia's
6 report about those five questions that the
7 epidemiologist posed to him and his team on page
8 26 and 27 of his report.

9 My question is: Do you have any basis
10 that disagree with Mr. Maslia that, in fact, these
11 were five objects and questions presented by the
12 epidemiologist to the team?

13 MR. ANWAR: Object to form.

14 THE WITNESS: That's what it's stated
15 there as being the objectives. My question and
16 critique on whether the work that ATSDR did could
17 actually answer those questions with any kind of
18 accuracy or certainty.

19 MS. BAUGHMAN: I'm going to object as
20 nonresponsive.

21 BY MS. BAUGHMAN:

22 Q. Here's my question. Do you have any
23 basis to disagree that at this meeting in October
24 of 2003, the epidemiologist presented these five
25 study objectives and questions to Mr. Maslia and

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1 his team? Do you have to any reason to disagree
2 that that occurred?

3 MR. ANWAR: Object to form.

4 THE WITNESS: I'm not sure. I don't
5 know what happened at that meeting. That's a
6 statement that Mr. Maslia is providing. I haven't
7 read anything in support of this to say that it's
8 true or not.

9 BY MS. BAUGHMAN:

10 Q. So you think it's possible that
11 Mr. Maslia is not telling the truth here, is that
12 what you're saying?

13 MR. ANWAR: Object to form.

14 THE WITNESS: I'm saying that I don't
15 know the facts. So I'm taking this at face value
16 at this point.

17 BY MS. BAUGHMAN:

18 Q. You have some statements in your report,
19 one of them is on page 30, where you say toward
20 the bottom of the page, "ATSDR ignored any
21 contaminant losses that would occur during
22 treatment."

23 I want to just ask you about that. I
24 know Dr. Hennet has offered some opinions on
25 volatilization. So my question for you is: Have

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1 you, yourself, performed any calculations
2 regarding alleged volatilization losses at the
3 water treatment plants?

4 A. No, I have not, my calculations and at
5 the treatment plant.

6 Q. So are you relying on the calculations
7 and the opinions of Dr. Hennes regarding the
8 quantification of any alleged VOC losses at the
9 water treatment plants?

10 A. Yes, I do.

11 Q. So I want to talk about something
12 different. In your report, I've counted this up,
13 you've used the word "arbitrary" 16 times to
14 describe ATSDR's estimates or expert judgments
15 regarding parameter values and other assumptions.

16 You're familiar with that, right, your
17 use of the word "arbitrary"?

18 A. I do not recall the number of times, but
19 you've used the word "arbitrary."

20 Q. What do you mean by "arbitrary"?

21 A. Well, I guess we have to go to the
22 specific. Can you give me an example so I can
23 talk about it? I don't know if the context across
24 the entire document is the same.

25 Q. Can you give me a definition of

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1 "arbitrary"?

2 MR. ANWAR: Object to form.

3 THE WITNESS: Again, I would like to see
4 the actual statement and tell you on that
5 statement what my opinion is.

6 BY MS. BAUGHMAN:

7 Q. Okay. Let's go to page 84.

8 A. 84 you said?

9 Q. Yep. By the way, so your testimony is
10 your definition of "arbitrary" might change in
11 each time you use it?

12 MR. ANWAR: Object to form.

13 THE WITNESS: No. I'm saying I would
14 like to see the statement and make sure that the
15 context is correct.

16 BY MS. BAUGHMAN:

17 Q. So the last sentence of the second full
18 paragraph under 4.2.5.1.1 says, "The empirical
19 data for undergrounds storage releases may or may
20 not be applicable to the USTs installed at Camp
21 LeJeune and, therefore, assignment of timing and
22 magnitude for these sources is arbitrary and
23 uncertain."

24 What's the word "arbitrary" mean?

25 A. It basically means that ATSDR looked at

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1 the analysis of 12,000 something leak incidents
2 across the United States, considered the timeframe
3 indicated in that report regarding when leaks
4 might have occurred, and within that timeframe,
5 they selected the mean value that was, if I
6 remember correctly, nine years.

7 The problem is that what happens across
8 the United States that doesn't mean that happened
9 in North Carolina. It certainly that doesn't mean
10 that we know what happened in each and every one
11 of those tanks at Camp LeJeune. So the assumption
12 is absolutely arbitrary because it's not informed
13 by any kind of site-specific data. It's an
14 average over the entire United States. To me,
15 that's the definition of arbitrary.

16 (Spiliotopoulos Exhibits 11 - 12 were marked.)

17 BY MS. BAUGHMAN:

18 Q. I'm going to hand you what I've marked
19 as Exhibits 11 and 12. And these are definitions
20 from the Oxford Dictionary and from the Miriam
21 Dictionary. Oxford is 11 and Miriam is 12 on the
22 definition of the word "arbitrary."

23 Exhibit 11, in Oxford, the first
24 definition is: Based on random choice or personal
25 whim rather than any reason or system. An

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1 arbitrary decision. So random choice.

2 The second definition on Miriam is:
3 Existing or coming about seemingly at random or by
4 chance or as a capricious and unreasonable act of
5 will.

6 Do you see those definitions?

7 A. I also see the second one there based on
8 or determined by individual preference or
9 convenience rather than by necessity or the
10 intrinsic nature of something. That's another one
11 there.

12 I would call very much of that semantics
13 in the sense that still ATSDR had no idea when
14 these tanks leaked. There's a fact that they
15 leaked.

16 Q. They did leak; right?

17 A. Yes, they did. But the problem is when.
18 And ATSDR proceeded one step further to take the
19 mean value and consider that the starting date.
20 When ATSDR did a sensitivity analysis, it
21 considered plus or minus nine years, which
22 actually suggests that there was no foundation in
23 the selection of values in their models, and the
24 uncertainty is so extreme that, yes, to me at that
25 point, it's arbitrary.

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1 MS. BAUGHMAN: I'll object to that whole
2 speech as nonresponsive to any question pending.

3 BY MS. BAUGHMAN:

4 Q. Now, let's go to Section 4.2.5.1.1 of
5 your report on page 84. That's where you
6 describe --

7 A. One second, please.

8 Q. That's where we just were.

9 A. Yes, but I closed it to see your other
10 exhibit.

11 Q. Page 84.

12 A. Okay.

13 Q. Page 84, you describe this EPA report
14 from 1986. Leaking around storage tanks that
15 ATSDR relied upon; right?

16 A. Yes.

17 Q. And that report from the EPA was based
18 on records of more than 12,500 reported leak
19 incidents; right?

20 A. Yes.

21 Q. And the ATSDR used the median value of
22 nine years after installation to assign release
23 dates to the leaks; correct?

24 A. Yes.

25 Q. And you call that assignment arbitrary;

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1 right?

2 A. Yes, I do because we have no idea when
3 they leaked. And this is a critical parameter
4 that goes into the model because it determines
5 when contamination started entering the aquifer.

6 Q. Are you aware of any other study that's
7 been performed regarding leaking underground
8 storage tanks in the United States that's
9 considered more data than what the EPA considered
10 in this 1986 study?

11 A. I'm not sure, but that's absolutely
12 relevant because what happens in a mean sense
13 across United States has nothing to do with what
14 happened at that site. And when the purpose of
15 this analysis is to determine monthly
16 concentrations over a period of time, we better
17 get right the starting time for that.

18 MS. BAUGHMAN: Object as nonresponsive.

19 BY MS. BAUGHMAN:

20 Q. The deposition -- I'm going to ask for
21 more time if you don't start answering my
22 questions instead of giving speeches.

23 MR. ANWAR: Please don't threaten the
24 witness. You can direct that to me.

25 MS. BAUGHMAN: You just make "Objection."

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1 Form."

2 MR. ANWAR: Don't threaten me either.

3 MS. BAUGHMAN: That's the second example

4 I'm going to give the court for you.

5 BY MS. BAUGHMAN:

6 Q. Now, Dr. Spilotopoulos, what research
7 did you do for your report regarding what's been
8 published regarding how long it takes for
9 underground storage tanks to leak? Did you look
10 at any other studies or data in addition to the
11 1986 EPA report?

12 MR. ANWAR: Object to form.

13 THE WITNESS: I did not have to.

14 BY MS. BAUGHMAN:

15 Q. Did you look at any?

16 A. No.

17 Q. Did you actually read the EPA's report
18 from 1986 on leaking underground storage tanks?

19 A. I reviewed the report which is why
20 actually I corrected the number of leaks that was
21 in the ATSDR report.

22 Q. Now, is there any reason that you can
23 identify as to why EPA's empirical data on the
24 12,000 underground storage tanks would not apply
25 to the USTs installed at Camp LeJeune?

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1 MR. ANWAR: Object to form.

2 THE WITNESS: Because the empirical data
3 look at different conditions in different places,
4 and, therefore, an average value of those has
5 nothing to do with what happened in Camp LeJeune
6 in each and every one of those tanks.

7 BY MS. BAUGHMAN:

8 Q. Why would the storage tanks leak at a
9 different time in Camp LeJeune? In other words,
10 is there something about the tanks that were used
11 at Camp LeJeune, their materials, how they were
12 installed, that's different from the tanks that
13 the EPA studied that you can identify?

14 A. Because corrosion occurs differently in
15 different parts of the country or even within the
16 same state close or far from the shoreline. There
17 are different geochemical and environmental
18 conditions. There are issues with installation,
19 good or bad installation. There's a number of
20 reasons why tanks would fail.

21 MS. BAUGHMAN: I'm going to object as
22 nonresponsive.

23 BY MS. BAUGHMAN:

24 Q. I'm focused first on the kind of tanks
25 that were installed at Camp LeJeune. Is there

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1 something about those tanks, about their materials
2 or how they were installed that makes them
3 different from what the EPA studied in the 12,000
4 tanks? Can you identify anything different about
5 the tanks themselves?

6 A. The EPA study looked at a number of
7 different types of tanks across the United States.
8 So they didn't perform a study on the particular
9 type that was installed at Camp LeJeune to provide
10 any kind of confidence in their estimates. This
11 is across the board for all types of.

12 MS. BAUGHMAN: Objection.
13 Nonresponsive.

14 BY MS. BAUGHMAN:

15 Q. Tell me what's different about the tanks
16 specifically at Camp LeJeune as compared to what
17 the EPA studied, the difference in the material,
18 the construction, the installation. Tell me
19 what's different.

20 MR. ANWAR: Objection to form to
21 foundation.

22 BY MS. BAUGHMAN:

23 Q. If you know.

24 A. I think I responded that the EPA report
25 looks at a number of different types and does not

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1 focus on the types of tanks that we encounter at
2 Camp LeJeune. And even if they did, the fact that
3 that is a range of failure time suggest that we
4 can't really tell when the tank will corrode and,
5 therefore, start leaking.

6 MS. BAUGHMAN: Objection.

7 Nonresponsive.

8 BY MS. BAUGHMAN:

9 Q. Can you tell me what type of tank, what
10 type of underground storage tanks were installed
11 at Camp LeJeune?

12 A. I do not know.

13 Q. What were they made off? What were the
14 materials?

15 A. I believe they were steel tanks, but I'm
16 not sure about the specifics.

17 Q. Who manufactured them?

18 A. I don't know.

19 MR. ANWAR: Object to form.

20 BY MS. BAUGHMAN:

21 Q. What years, what are the range of years
22 that the underground storage tanks were installed?

23 A. I'm sorry. Can you repeat that
24 question?

25 Q. Yeah. When were the underground storage

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1 tanks installed at Hadnot Point?

2 A. I don't recall the installation time for
3 each tank.

4 Q. Did the EPA study include the type of
5 tanks that were installed at Camp LeJeune in the
6 study?

7 A. I don't even know if that were the case
8 or how close they would come to the exact type.

9 Q. Do you know whether the EPA study
10 included the type of environmental conditions that
11 the underground storage tanks would find at Camp
12 LeJeune as part of the type as part of their
13 study? Let's just say this. Were there -- strike
14 that.

15 Did the EPA study include tanks that had
16 been installed in North Carolina?

17 A. I do not know, but it would still be
18 irrelevant. It doesn't answer question as to when
19 the specific ones leaked.

20 Q. How many of the 12,000 tanks that the
21 EPA studied had similar geochemical and
22 environmental conditions as the tanks at Camp
23 LeJeune?

24 MR. ANWAR: Object to form. Foundation.

25 THE WITNESS: I do not know. I do know,

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1 however, that ATSDR looked at that and actually
2 looked at the sensitivity of 18 years of possible
3 release time. So that speaks volumes about what
4 ATSDR considered about the time.

5 MS. BAUGHMAN: Object as nonresponsive
6 to everything after "I do not know."

7 BY MS. BAUGHMAN:

8 Q. You also believe that the source release
9 timeframe of seven years for the landfill area is
10 arbitrary; right?

11 A. I don't see how we could have known what
12 the time was.

13 Q. So let's talk about the landfill for a
14 minute. You went to the landfill when you had
15 your site visit, right, last year at Camp LeJeune?

16 A. We went by the landfill. We saw that at
17 some distance. We didn't actually walk on it.

18 Q. So Hadnot Point began operations in
19 1942; right?

20 A. Yes. That's my understanding.

21 Q. When were materials -- when that did
22 waste begin to be disposed at the landfill at
23 Hadnot Point?

24 A. I don't think we have a good
25 understanding of what types of materials and the

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1 timing of the disposal occurred at the landfill.
2 We have some general ideas. I don't even know
3 that we know exactly where they started being
4 disposed of and the progression of the landfill
5 coverage, that it's fully understood.

6 Q. I'm not asking about "we." I'm asking
7 about you, what you know. When you say "we," I
8 don't know who you're talking about. So just to
9 be clear, when I ask questions, I'm asking about
10 your knowledge. Okay?

11 When Hadnot Point opened in late 1941
12 and 1942, where were wastes disposed? Was there
13 another landfill used, or was it always this
14 landfill?

15 MR. ANWAR: Object to form and
16 foundations.

17 THE WITNESS: I think that was the case
18 where things were disposed, but I'm not a hundred
19 percent sure. In my analysis I worked with the
20 sources identified by ATSDR. So I took those for
21 granted in terms of the analysis.

22 BY MS. BAUGHMAN:

23 Q. Turn to page 14 of your report. The
24 first sentence on page 14, you wrote, "Historical
25 based operations and waste disposal practices have

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1 been identified as being responsible for the
2 contamination of groundwater and finished water
3 supply to the Hadnot Point and Holcomb Boulevard
4 area." Correct?

5 A. Yes.

6 Q. Do you agree that those were the sources
7 of contamination at Hadnot Point?

8 A. I'm just stating what I have read in
9 timelines and reports about Hadnot Point. I do
10 not have any personal knowledge on this.

11 Q. You agree that industrial wastes were
12 disposed of at the Hadnot Point landfill?

13 A. Possibly, yes, I think so. But I'm not
14 a hundred percent sure.

15 Q. Do you know what was disposed of at that
16 landfill?

17 A. I do not recall the details. Like I
18 said, I took ATSDR's assumptions regarding the
19 source location and type as the starting point of
20 my analysis.

21 Q. Was the landfill lined at Hadnot Point?

22 MR. ANWAR: Object to form and
23 foundation.

24 BY MS. BAUGHMAN:

25 Q. If you know.

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1 A. I'm not sure. I don't think so, but I'm
2 not sure.

3 Q. So when waste was disposed of there, was
4 it disposed of in containers, or was it just
5 dumped on the ground?

6 A. I think there were different types of
7 products that were disposed and different
8 packaging of the disposed material. So there were
9 tanks, but there was other material that was
10 loose. That's my understanding in general terms,
11 but I do not know in detail how material was
12 disposed there.

13 Q. You said there were tanks. Are you
14 referring to underground storage tanks?

15 A. No. I'm sorry. I misspoke. I think of
16 drums perhaps, but I don't know. I'm just
17 speculating again on the types of materials that
18 were disposed.

19 Q. So what precautions were taken in the
20 1940s to make sure that the waste that was dumped
21 at the Hadnot Point did not leach into the
22 groundwater? Are you aware of any?

23 MR. ANWAR: Object to form and
24 foundation.

25 THE WITNESS: I'm not offering an

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1 opinion on that. I'm not in a position to answer
2 that question.

3 BY MS. BAUGHMAN:

4 Q. You don't know, do you?

5 A. I do not know.

6 Q. So if the landfill began accepting
7 industrial waste dumped on the ground without
8 liners and containers in 1942, why would it be
9 arbitrary to assume that the contaminant releases
10 began seven years later? Why is that arbitrary?

11 MR. ANWAR: Objection.

12 THE WITNESS: Because there are no data
13 on which calculations can be based to determine
14 that.

15 BY MS. BAUGHMAN:

16 Q. What timeframe -- I want you to assume
17 with me that it's opened in 1942 and the waste
18 begins to be dumped there, and they aren't taking
19 precautions because that wasn't done at the time
20 to make sure that these wastes did not leak in the
21 groundwater.

22 How long do you think it would take for
23 the release to start?

24 MR. ANWAR: Object to form.

25 THE WITNESS: I have no data to offer an

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1 opinion on that.

2 BY MS. BAUGHMAN:

3 Q. Did you look into it?

4 A. No, I did not. I could not, anyways.

5 (Spiliotopoulos Exhibit 13 was marked.)

6 BY MS. BAUGHMAN:

7 Q. I'm handing you what I've marked as
8 Exhibit 13 to your deposition, and that is Chapter
9 F, Simulation of the Fate and Transport of PCE
10 from Tawara Terrace.

11 I'm going to ask you some questions, but
12 first I wanted to ask you: Do you agree that the
13 water supply well that was the largest contributor
14 of PCE to the Tawara Terrace water treatment plant
15 was well TT-26?

16 A. I agree.

17 Q. Let's look at page F34. And I want to
18 ask you some questions about the Figure F16.
19 Okay?

20 Now, do you see that there's a short
21 timeframe where there were five observed values of
22 PCE that vary from about 1600 micrograms per liter
23 to about 100 micrograms per liter?

24 A. I can above the one, but, yes, that's
25 range approximately, yes.

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1 Q. And you can see that the simulated value
2 at that time produced by the Tawara Terrace water
3 model of ATSDR shows approximately 800 micrograms
4 per liter when those five values were measured;
5 right?

6 A. Actually, if I recall correctly, that
7 800 was a little before that. It was a little
8 less than that during the time when those
9 measurements were available. But roughly, yes.

10 Q. One question I have for you is looking
11 at -- this is TT-26, right, that we're looking at,
12 the simulation and the measured values; right?

13 A. Yes.

14 Q. Can you explain to me why, if you
15 believe it, why this result would show an
16 indication of the model results being biased high?

17 A. First things first. This is a graph of
18 the historical reconstruction at well TT-26 for
19 which data are available to test its accuracy are
20 only from December '84, January '85, like that
21 critical inflection point, at which point the well
22 is turned off. Then there's another datapoint in
23 1991.

24 When I look at this graph, the first
25 thing that I see is when we look at what happens

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1 in 1991, the model calculates practically double
2 the concentration that is measured in the aquifer
3 at that time. So that's a bias high. With
4 respect to what happens prior to that date, this
5 is not the only graph to look at to arrive to that
6 conclusion.

7 You have to look at all of them from F13
8 to F17. And all of them are showing that the
9 model overestimates the concentrations, the
10 measured concentrations at the wells at all times.

11 Q. The other three are not about TT-26;
12 right?

13 A. No. From RW to near the source to TT23,
14 25 and 54.

15 Q. Would you agree the PCE values observed
16 at Tawara Terrace showed a high degree of
17 variance?

18 A. I'm sorry. Repeat that again.

19 Q. Do you agree that the PCE values
20 observed at Tawara Terrace show a high degree of
21 variance?

22 A. Well, the variance that we see in these
23 results is expected given the timeframe that they
24 represent if you collect data within a few days
25 from each other. Of course, you can have the kind

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1 of variability. The problem here is that you have
2 no historical data to test whether the variability
3 you see in '85 is similar to what you see in the
4 previous year and what the trends are
5 historically. So we're only looking at a point in
6 time.

7 MS. BAUGHMAN: I'll object as
8 nonresponsive to everything starting with "the
9 problem here" and going from there.

10 BY MS. BAUGHMAN:

11 Q. When you're calibrating a transport
12 model to observations with a high degree of
13 variance, is it realistic to expect that the
14 simulated concentrations would match the observed
15 concentrations with a high degree of precision?

16 A. Precision or accuracy?

17 Q. I asked precision first.

18 A. Precision is something that is difficult
19 to get. You have to have a great model to do
20 that. You have to have an accurate model,
21 nonetheless, that comes close to the observed
22 values.

23 MS. BAUGHMAN: I'm going to object as
24 nonresponsive.

25

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1 BY MS. BAUGHMAN:

2 Q. If you're calibrating a transport model
3 to observation to high degree of variance, is it
4 realistic to expect that the simulated
5 concentrations would match the observed
6 concentrations with a high degree of precision?

7 MR. ANWAR: Object to form.

8 THE WITNESS: I'm not sure I can answer
9 this question in a different way. If I only
10 answer with respect to precision, I'm taking
11 things out of context here.

12 The critical issue in the model
13 calibration is that the model is, first of all,
14 accurate. So it comes close to the real value.
15 How close is determined by precision. That's a
16 different thing.

17 MS. BAUGHMAN: I'm going to object as
18 nonresponsive.

19 BY MS. BAUGHMAN:

20 Q. Would you expect the model results to
21 match each of the five observed values at TT-26
22 with a high degree of precision?

23 MR. ANWAR: Object to form.

24 THE WITNESS: Of course, not, because
25 the model simulates monthly concentrations, and

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1 these are daily values.

2 (Spiliotopoulos Exhibit 14 was marked.)

3 BY MS. BAUGHMAN:

4 Q. Let me ask you. I'm going to mark as
5 Exhibit 14. I have one copy, but it's just a
6 blowup of Figure 26 -- F16.

7 I've handed you Exhibit 14, which you
8 can compare, if you want to, to Exhibit 13, page,
9 F34. You see it is Figure F16 from Tawara Terrace
10 Chapter F; right?

11 A. Yes, it looks like it.

12 Q. So what I'm going to ask you to do --
13 I'll hand you a Sharpie. If the simulated value
14 was to be precise and to precisely match up to
15 with a high degree of precision the measured
16 numbers, show me what that simulation would look
17 like. Here's on the marker.

18 Can you graph that for me what that
19 would look like?

20 A. But again, we have different values
21 measured over a number of days, and the model
22 calculate a monthly average value. There's no
23 precision here. There's accuracy. What kind of
24 precision can we have if we have different
25 measured concentration over different days and the

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1 model calculates a monthly average value? The
2 model is not constructed to calculate daily
3 values.

4 Q. Would it be reasonable to assume that
5 the model simulated concentrations would vary as
6 much as the data shown in F16 over that short
7 period of time?

8 MR. ANWAR: Object to form.

9 THE WITNESS: I'm sorry. Can you repeat
10 that question, make sure I understand it.

11 BY MS. BAUGHMAN:

12 Q. Would it be reasonable to expect the
13 called simulated concentrations to vary the way
14 it's shown in F16 over that period of time?

15 MR. ANWAR: Object to form.

16 THE WITNESS: Actually, based on the
17 approximations in the model from the cell size
18 loading and plume size and the variability, I
19 would expect it not to change unless the model had
20 daily pumping rates that would reflect the actual
21 operation of the wells during those days, because
22 what you see at the well is directly related to
23 the pumping rate for that date.

24 Here the model assumes a monthly average
25 flow rate and calculates a monthly concentration.

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1 BY MS. BAUGHMAN:

2 Q. Can you draw for me on what we've marked
3 as Exhibit 14 what the simulation would look like
4 if it was accurate with respect to the values
5 shown on F16?

6 A. You mean with respect to the monthly
7 average concentration that it calculate?

8 Q. Yes.

9 A. It would probably be somewhere very
10 close to that.

11 Q. Close to what's shown in F16 right now?

12 A. Yes, maybe a little higher or a little
13 lower. To me they would all be acceptable. Given
14 the range of observations, something within that
15 range would be accurate enough.

16 Q. Thank you.

17 A. That doesn't say anything about the
18 history of contamination at that well,
19 nonetheless.

20 MS. BAUGHMAN: Object as nonresponsive
21 to everything after "accurate enough."

22 BY MS. BAUGHMAN:

23 Q. If you could turn in your report to page
24 36. Just to be clear about F14, what you just
25 told me is -- I asked you to draw on F16, Figure

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1 F16 where the simulation would be if you were
2 trying to show accuracy with respect to those
3 datapoints that are almost at the same timeframe.
4 And you said you can't draw anything better than
5 what's on F16 now; is that right?

6 A. No. What I said is that a model would
7 predict a value that would be somewhere within
8 that range and we would preferably like it to be
9 somewhere within that range, maybe a little higher
10 or a little lower in by itself.

11 Q. Show me what you think would be
12 accurate. If the model were accurate for F16,
13 where would it be? Here's the marker.

14 A. Hold on a sec. I would like to answer
15 your question, but I have to answer it in a way
16 that makes sense.

17 What I said is that the model provides a
18 approximation of the measured concentrations at
19 that time. The problem here is that in the
20 absence of historical concentrations prior to
21 that, whether a value is a little higher or a
22 little lower cannot be evaluated even by itself.

23 In other words, you can have a model
24 that maybe at that date, it can show a higher
25 concentration than what this one says. But prior

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1 data would show what the trend is like to get
2 there. And looking at all the data, we would make
3 a determination as scientists whether that's an
4 accurate model. Having only data for one month
5 and trying to see if the model is accurate on that
6 date, it's not necessarily meaningful because,
7 like I said, maybe the model would give us
8 something lower than that, maybe something that's
9 700, maybe something that's 900.

10 You have to look at the history and not
11 just one datapoint and determine whether it's
12 accurate or not.

13 MR. ANWAR: Object as nonresponsive.

14 BY MS. BAUGHMAN:

15 Q. That is not what I asked you. I asked
16 you to draw if you don't think that's an accurate
17 representation of the values at that time, at that
18 timeframe where those five were taken. If that
19 doesn't represent accuracy in your definition of
20 accurate, show me what would be accurate. I want
21 you to draw it. I don't want an explanation. I
22 just want you to draw. What would be more
23 accurate?

24 MR. ANWAR: I'm just going to note you
25 don't need to draw anything if it's not possible

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1 to.

2 THE WITNESS: I'm answering the
3 question. I think you changed the question. But
4 nonetheless, I'm trying to answer your question.

5 An accurate solution within this range
6 of values is this one. It can be a little, a
7 higher a little lower. What I'm trying to say
8 that and in by itself with one essentially
9 datapoint with just over one month, you cannot
10 opine on the accuracy of the model because the
11 accuracy of the model cannot be determined on the
12 basis of one point.

13 If you were to take the average of these
14 values and compare the average to that simulated
15 value, you can come as close as 10 micrograms per
16 liter, 20, 50, a hundred. Any of those would be
17 fine provided that you have enough information to
18 determine that getting there is acceptable.
19 Otherwise, with just one point, you cannot answer
20 that question.

21 MS. BAUGHMAN: Objection.

22 Nonresponsive.

23 BY MS. BAUGHMAN:

24 Q. Can you come up with a number or can you
25 mark it on there what would be more accurate than

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1 what's simulated on F16 at that point. I'm not
2 asking before or after. I'm asking you for that
3 point right there. Is there a more accurate
4 number or a more accurate point than what we see
5 there in F16? If there is, I would like you to
6 draw it for me.

7 A. And I'm saying there are many values
8 here that can be considered accurate with respect
9 to comparing them to the measured values. There's
10 a range here that is fine. But there's no single
11 value that is more or less accurate. This is a
12 relative term.

13 Q. So what is modeled in F16 is within the
14 range of accuracy for that point in time; right?

15 MR. ANWAR: Object to form, foundation.

16 THE WITNESS: And again to provide
17 context to that answer, I'm saying that if we're
18 to look only at that value, we'd say that's close
19 enough. But that's not enough to say anything
20 about the calibration of the model.

21 MS. BAUGHMAN: Object as nonresponsive
22 to everything after "that's close enough."

23 BY MS. BAUGHMAN:

24 Q. Let's go to page 36 of your report.
25 Under Section 4.1.2.1, your first sentence is:

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1 "In its contaminant transport model, ATSDR
2 represented the PCE contamination source at Tawara
3 Terrace as ABC One-Hour Cleaners."

4 Do you see that?

5 A. Yes.

6 Q. Do you disagree with ATSDR's conclusion
7 that ABC Cleaners was the source of the PCE
8 contamination at Tawara Terrace?

9 A. That's my understanding of what the
10 source of contamination there is.

11 Q. You haven't identified any other source;
12 right?

13 A. No, I have not, or to be more precise, I
14 have not looked at any other sources. I took this
15 as the source of contamination.

16 Q. So in terms of determining the mass
17 loading rate at Tawara Terrace, you'd agree that
18 ATSDR looked at the available data and began with
19 a mass loading rate of approximately 200 grams per
20 day; right?

21 A. I'm sorry. You're referring to
22 something that I said here?

23 Q. No, I'm not. I'm just referring. Do
24 you remember?

25 A. Off the top of my head, no. If you can

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1 point me to the document, I can...

2 Q. You agree with me ATSDR adjusted the
3 mass loading for Tawara Terrace in its calibration
4 process?

5 A. That I agree on, yeah.

6 Q. Isn't that a generally-accepted
7 methodology?

8 MR. ANWAR: Object to form.

9 THE WITNESS: In general, yes. But in
10 order to do that, you have to have several
11 datapoints to be able to calibrate to that.
12 Otherwise, it's an assumption that cannot be
13 verified or tested.

14 BY MS. BAUGHMAN:

15 Q. In your modeling efforts in fate and
16 transport of contaminants, have you ever adjusted
17 the source mass loading rate as part of the
18 calibration process?

19 A. Of course, following the steps I just
20 described using data to calibrate the model to
21 that.

22 Q. In your opinion at the bottom of page 36
23 is that ATSDR start date for the PCE source
24 release at ABC One-Hour Cleaners was incorrect;
25 right?

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1 A. Yes.

2 Q. And what was your methodology that you
3 used to determine the correct start date?

4 A. I believe Dr. Brigham provides the
5 foundation for supporting this argument.

6 Q. So you reviewed their report of defense
7 expert Dr. Brigham; right?

8 A. Yes, I did.

9 Q. Did you do anything else to determine
10 what the alleged correct start date is at ABC
11 One-Hour Cleaners other than review Dr. Brigham's
12 work?

13 A. I looked at documents myself, but his
14 expert report provides all the supporting material
15 for that opinion.

16 Q. Did you review any documents other than
17 those cited by Dr. Brigham?

18 A. No, I don't believe so.

19 Q. Are you aware of that ATSDR relied on
20 the sworn testimony of Victor Metz, owner of the
21 ABC One-Hour Cleaners for the 1953 start date?

22 A. That is true. Dr. Brigham brings a lot
23 more information to that subject.

24 MS. BAUGHMAN: Object as nonresponsive
25 to everything after that is true.

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1 BY MS. BAUGHMAN:

2 Q. Is it your opinion that relying on sworn
3 testimony is improper?

4 MR. ANWAR: Object to form.

5 THE WITNESS: I'm not sure I can answer
6 that question. I'm just saying that I don't think
7 that the information provided there was correct
8 based on all the information and material that
9 Dr. Brigham provided.

10 BY MS. BAUGHMAN:

11 Q. Did you review the deposition of Victor
12 Meltz?

13 A. I think I read the portion where he
14 mentioned -- I think he responded to questions
15 about the starting date.

16 Q. The deposition of Victor Meltz is not on
17 your Supplemental and Amended Reliance List,
18 Exhibit 6. Is there a reason it's not on there if
19 you reviewed it?

20 A. That's a good question. I would have to
21 check.

22 Q. Do you actually remember reading the
23 deposition?

24 A. I'm trying to remember if I read the
25 deposition itself or if it's Dr. Brigham's text

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1 that referred to that. I'm not clear at the
2 moment. I'm thinking of the deposition and what
3 Mr. Meltz said. But I don't recall if it was in
4 Dr. Brigham's report. I do not recall.

5 Q. As you sit here today, you don't know
6 whether you read Victor Meltz' deposition; is that
7 fair?

8 A. That's a good question. I'm not sure.
9 I know that Dr. Brigham provided information on
10 that, and maybe I'm thinking what I read there is
11 as if I was reading his report, his deposition.
12 I'm not sure.

13 MR. ANWAR: Just for the record to
14 clarify something you said, Laura, it's identified
15 by Bates-stamped on his reliance list.

16 MS. BAUGHMAN: Where do we look?

17 MR. ANWAR: It's
18 COW_WATERMODELING_09-0000650741.

19 MS. BAUGHMAN: In the future, if you're
20 going to deal with something like that, I want you
21 to deal with it with the witness outside the room
22 because that is a form of coaching. That's the
23 third time that you've done it. If you want to
24 point that out, we'll take a break. He can leave
25 and you can tell me. Or you obviously can ask him

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1 questions at the end, but doing that now is
2 improper.

3 MR. ANWAR: I'll note that for the next
4 deposition.

5 BY MS. BAUGHMAN:

6 Q. Can you tell me what Victor Meltz said
7 in his deposition about when he began operating
8 ABC One-Hour cleaners?

9 A. I do not recall verbatim, but I think he
10 said that the business started in '53 perhaps or
11 at least that's -- and I don't recall if that's
12 what he said or what I read in the report, the
13 ATSDR report referring to that source.

14 I'm not clear as to what the source of
15 my recollection is, but my understanding is that
16 ATSDR suggested that, based on Mr. Meltz'
17 deposition, the starting date was 1953.

18 Q. I just want to know what do you
19 remember. Assuming you reviewed Victor Meltz'
20 deposition, what did he say? What do you know
21 about what he said. If you don't know, just tell
22 me that.

23 A. I do not remember verbatim. Like I
24 said --

25 Q. I'm not having verbatim. What year did

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1 he say he started his business? What year did
2 Victor Meltz say he started his dry cleaning
3 business, ABC One-Hour Cleaners?

4 A. I'm not sure. I remember it is possible
5 that he said 1953, but I'm not a hundred percent
6 sure if that's what it is or what I remember from
7 the ATSDR report stating that date and attributing
8 that to Mr. Meltz' deposition.

9 Q. So in any event, the impact on using a
10 start date of July 1954 instead of January 1953 is
11 limited to the early 1950s; right? That's what
12 you wrote in your report?

13 A. I'm just stating the fact that it's
14 incorrect and to a great extent conservative
15 because even if the business started operation in
16 1953, for ATSDR to choose January 1, 1953 as the
17 starting date for the source of mass loading is a
18 conservative assumption and certainly wrong.

19 MS. BAUGHMAN: Objection.
20 Nonresponsive.

21 BY MS. BAUGHMAN:

22 Q. That's not what I asked you. I'm going
23 to start counting now. This is number two. I'm
24 going to keep counting them because you're wasting
25 my time. Try to answer my questions.

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1 MR. ANWAR: Please speak to the witness
2 respectfully.

3 BY MS. BAUGHMAN:

4 Q. At the bottom of page 36 of your report,
5 you wrote, "This incorrect assumption resulted an
6 estimate monthly contaminant concentrations that
7 were conservative and biased high in the early
8 1950s."

9 Isn't it true that you're saying the
10 impact of having a start date of July 1954 instead
11 of January 1953, the impact of that is limited to
12 the early 1950s? It didn't affect the modeling
13 results beyond that, did it?

14 A. With respect to the starting date, no,
15 it had an impact on that start of contamination in
16 the aquifer by a certain amount of time, yes.

17 Q. It impacted the early 1950s only;
18 correct?

19 MR. ANWAR: Object to form.

20 THE WITNESS: In terms of introducing
21 mass in the aquifer, yes.

22 BY MS. BAUGHMAN:

23 Q. EPA placed both Camp LeJeune and ABC
24 One-Hour Cleaners on the National Priorities List
25 in 1989; right?

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1 A. I will have to check the timeline for
2 the correct date.

3 Q. Page 16 of your report.

4 A. Yes.

5 Q. Why is it important that both Camp
6 LeJeune and ABC One-Hour Cleaners were placed on
7 the National Priorities List?

8 A. I'm not sure I understand the question.

9 Q. You put it in your timeline. What does
10 it mean? What's the National Priorities List?

11 A. The National Priorities List is when a
12 site is contaminated and EPA considers that
13 requiring attention in terms of remediation and
14 protection of recipients -- I'm sorry -- receptors
15 of contaminated water.

16 Q. It's on the National Priorities List
17 also, that's because it's a Superfund list; right?
18 It's a Superfund site; right?

19 A. That is correct.

20 Q. Both ABC One-Hour Cleaners and Camp
21 LeJeune are on the Superfund list.

22 A. Yes. In 1989 they were placed on the
23 list.

24 Q. What's a receptor of a contaminated
25 water? It's a phrase you just used. Is that a

ALEXANDROS SPILIOTOPOULOS, PH.D.

1 person?

2 A. It depends. A person, natural
3 environment.

4 Q. You agree that the water delivered to
5 residents in Tawara Terrace from the Tawara
6 Terrace water treatment plant was for some period
7 of time between 1954 and 1987 contaminated with
8 PCE?

9 MR. ANWAR: Object to form.

10 THE WITNESS: You're talking about the
11 Tawara Terrace treatment plant; is that correct?

12 BY MS. BAUGHMAN:

13 Q. Yes.

14 A. For some time, yes.

15 Q. And you haven't identified that
16 timeframe in your report; right?

17 A. No, I have not.

18 Q. We talked about this. You haven't
19 identified when the contaminated groundwater at
20 Tawara Terrace first reached any water supply well
21 by TT-26-26 or any of the others; right?

22 A. I think we have -- we have data in 1982
23 and in '85 and beyond that. We also have a
24 composite sample from 1980 that showed no
25 contamination. It's one datapoint, but it is a

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ALEXANDROS SPILIOTOPOULOS, PH.D.

1 datapoint that suggests there was no contamination
2 there in 1980.

3 MS. BAUGHMAN: I object as
4 nonresponsive.

5 BY MS. BAUGHMAN:

6 Q. In your report have you identified the
7 date when contaminated groundwater first reached
8 any water supply well at Tawara Terrace?

9 A. No, I have not done that in my report.

10 Q. In your report have you identified the
11 timeframe when contaminated water first reached
12 the Tawara Terrace water treatment plant?

13 A. No, I have not.

14 Q. On page 3 of your report, opinion 6, you
15 say that "ATSDR's dose reconstruction groundwater
16 model for drinking water in Tawara Terrace
17 estimated monthly contaminant concentrations that
18 were conservative and biased high, not reflecting
19 observed data that indicated absence of
20 contamination in the aquifer."

21 What data are you referring about that
22 indicate absence of contamination?

23 A. I would refer to the figures you showed
24 me earlier from the extraction wells. So I don't
25 know how we can go back to that figure. That's

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1 Exhibit 13, page 34. For example, Figure F15
2 shows well TT-25, we had a nondetect value. The
3 model calculates a much higher value. If you look
4 at TT-54, it shows a nondetect as observations,
5 but the model calculates higher values than that.

6 MS. BAUGHMAN: I'm going to object as
7 nonresponsive.

8 BY MS. BAUGHMAN:

9 Q. I'm asking you not if the model didn't
10 reflect the data. I'm asking you what data
11 indicates absence of contamination? What's the
12 data you're relying on for absence of
13 contamination of the aquifer at Tawara Terrace?

14 A. I'm just pointed at them in these
15 figures.

16 Q. So when there's a nondetect value, in
17 your mind that proves that the aquifer is not
18 contaminated?

19 A. Well, in Tawara Terrace, where we have
20 samples, for example, where the lab analysis
21 showed that there is trace of contamination below
22 the detection limit, they marked that with a J.
23 Where there was not case, it was just a nondetect.

24 So the lab was capable of detecting
25 traces of contaminations in wells. When it

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1 didn't, it gave a nondetect. My sense is that in
2 most of those cases and especially when you have
3 multiple samples that show nondetect, it's highly
4 unlikely that there is contamination there. It's
5 certainly much lower than what the model
6 calculates.

7 Q. I'm talking about absence of
8 contamination in the aquifer. That's the phrase
9 that you used. So you're saying that one
10 nondetect sample means the entire aquifer is not
11 contaminated?

12 MR. ANWAR: Object to form.

13 BY MS. BAUGHMAN:

14 Q. Is that what you're saying?

15 A. I'm saying that the only information we
16 have about contamination -- sorry. You're talking
17 about contamination in the aquifer or wells?

18 Q. You used the phrase aquifer. You used
19 the phrase absence of contamination in the
20 aquifer. So I'm asking you if there is a
21 nondetect found, does that indicate that the
22 aquifer is not contaminated?

23 A. I'm saying that it is indication that
24 there is no contamination where samples are taken
25 and, therefore, we have to look a different way on

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ALEXANDROS SPILIOTOPOULOS, PH.D.

1 determining how much contamination is in the
2 aquifer, where and when. I'm looking at just the
3 data. In the absence of data, I'm just making
4 estimates.

5 Q. Do you agree that the water delivered to
6 residents at Hadnot Point from the Hadnot Point
7 water treatment plant was for some period of time
8 between 1954 and 1987 contaminated with TCE and
9 PCE?

10 A. For some period of time, yes.

11 Q. Same for the BTEX compounds?

12 A. I do not have an opinion on that. I
13 have not looked at BTEX.

14 Q. What about vinyl chloride?

15 A. I only looked at the modeling work for
16 Hadnot Point. But there was probably some vinyl
17 chloride, but I did not focus my analysis on that
18 to tell you how much was there and whether that
19 would be considered as contamination above some
20 level.

21 Q. So you haven't identified the period of
22 time in your report when the Hadnot Point water
23 treatment plant water was contaminated with TCE
24 and PCE; right?

25 A. For Hadnot Point you're saying?

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ALEXANDROS SPILIOTOPOULOS, PH.D.

1 Q. Yes.

2 A. I think it's impossible to answer that
3 question with the data available.

4 Q. It's not in your report, is it?

5 A. No. If it's not highlighted the reason
6 why, we cannot answer that question.

7 Q. You haven't identified in your report
8 when contaminated groundwater first reached any
9 water supply at Hadnot Point; right?

10 A. No. I don't think that's possible.

11 Q. And you haven't identified in your
12 report when contaminated water at Hadnot Point
13 first reached the Hadnot Point water treatment
14 plant; right?

15 A. In my report I have not, but -- I will
16 stop there.

17 Q. Do you agree that prior to
18 December 1954, the level of PCE in the water at
19 the Tawara Terrace water treatment plant was zero?

20 MR. ANWAR: Object to form.

21 THE WITNESS: You're talking about the
22 aquifer or well? You're saying in the aquifer,
23 there's no PCE in the aquifer, is that what you
24 asked me?

25

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ALEXANDROS SPILIOTOPOULOS, PH.D.

1 BY MS. BAUGHMAN:

2 Q. Well, I didn't ask you about the
3 aquifer. I asked you about the PCE in the Tawara
4 Terrace water treatment plant.

5 A. It was not contaminated with PCE at that
6 time.

7 Q. So prior to December 1954, you agree
8 that there was not PCE in the water at the Tawara
9 Terrace water treatment plant. The levels were
10 zero; right?

11 A. I would be confident about that
12 considering the one source being ABC One-Hour
13 Cleaners.

14 Q. So level of PCE in the groundwater was
15 zero, you agree, prior to ABC starting its
16 operations; right?

17 A. Yes. Assuming that's the only source of
18 contamination in the aquifer, yes.

19 Q. And you don't have any information about
20 any other source?

21 A. I only looked at that based on ATSDR's
22 assumptions.

23 Q. So we know the initial conditions,
24 right, at Tawara Terrace in the aquifer for PCE.
25 We know the initial condition was zero; right?

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1 A. Yes.

2 Q. Do you agree that prior to
3 December 1951, the level of PCE and TCE in the
4 water at the Hadnot Point treatment plant was
5 zero?

6 A. '51 you said?

7 Q. Yeah.

8 A. For Hadnot Point we have no idea when
9 contamination was not there on the basis of the
10 assumptions by ATSDR. I had my assumption that it
11 would be much later than that actually.

12 MS. BAUGHMAN: So then I'm going to
13 object as nonresponsive.

14 BY MS. BAUGHMAN:

15 Q. So do you believe that prior to
16 December 1951, the levels of PCE and TCE in the
17 water at the Hadnot Point watered treatment plant
18 were zero?

19 MR. ANWAR: Object to form.

20 THE WITNESS: Based on the data that I
21 have seen, I believe there was no contamination at
22 that time.

23 BY MS. BAUGHMAN:

24 Q. So again for Hadnot Point, we know what
25 the initial conditions were; right? They were

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1 zero.

2 MR. ANWAR: Object to form.

3 THE WITNESS: The initial condition used
4 in the model is the assumed timing of start of
5 mass releases, and those are different times.
6 That's the starting addition.

7 BY MS. BAUGHMAN:

8 Q. Before --

9 A. So we have a lead source and see when
10 contamination was introduced in the aquifer based
11 on the model assumptions.

12 Q. Let me say it this way. Before 1942
13 when they built the Hadnot Point water treatment
14 plant and Hadnot Point itself, was there any
15 contamination in the aquifer?

16 A. I don't believe there was there, no.

17 Q. So it started out at zero; right?

18 A. In 1942 you said?

19 Q. Right.

20 A. Not any other date.

21 Q. And then we went all the way to
22 December 1951. And you would agree that even as
23 of December 1951, the water in the water treatment
24 plant at Hadnot Point would be zero; right?

25 A. Again, that's an arbitrary number. I

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1 don't know where you're coming up with this
2 number. You have to explain to me where that
3 number is coming from.

4 Q. I'm asking you. Do you think water is
5 contaminated at the Hadnot Point water treatment
6 plant in December 1951 with TCE or PCE?

7 A. I don't know when contamination reached
8 the groundwater at Hadnot Point. What I'm saying
9 is that we have no idea of knowing what happened
10 at Hadnot Point. ATSDR showed exactly that in its
11 sensitivity analysis.

12 MR. ANWAR: Whenever you're at a good
13 spot, we've been going for about an hour.

14 MS. BAUGHMAN: Sure. We can take a
15 break.

16 THE VIDEOGRAPHER: Off the record at
17 1508.

18 (Recess from 4:08 p.m. to 4:22 p.m.)

19 THE VIDEOGRAPHER: On the record at
20 1622.

21 BY MS. BAUGHMAN:

22 Q. Dr. Spilotopoulos, do you agree that the
23 lack of a high reading at one sampling location in
24 an aquifer does not mean that the aquifer is not
25 contaminated in other locations?

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ALEXANDROS SPILIOTOPOULOS, PH.D.

1 MR. ANWAR: Object to form.

2 THE WITNESS: You're talking about the
3 sample in one location?

4 BY MS. BAUGHMAN:

5 Q. Yes.

6 A. Yes. It's not representative of what's
7 happening in the entire aquifer. It's about what
8 it shows at that location. But other inferences
9 can be made.

10 Q. Can you turn to page 10 of your report
11 please.

12 A. Yes.

13 Q. Under 3.1.8, Concluding Remarks, in the
14 middle of that first paragraph, you have a
15 sentence where you state, "In all cases, a model
16 is required to reasonably fit the measured data to
17 reliably tell us what happens when data are not
18 available."

19 Did I read that correctly?

20 A. Yes.

21 Q. And that's your opinion; right?

22 A. Yes.

23 Q. Can you define what "reasonably fit"
24 means?

25 A. It depends on the case. There's no

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1 single metric to that.

2 Q. I think you answered this question, but
3 is there a -- can it be quantified. In other
4 words, is there a test or a numerical value that
5 would qualify or be defined as a reasonable fit?

6 A. We use metrics to calculate that. And
7 depending on the number of points we have, for
8 example, those metrics can take a different
9 meaning if we have many points versus few things
10 points and things like that. So everything is
11 relevant and it has to be looked at case by case.

12 Q. Somewhere is there a definition of
13 reasonable fit in your industry, like a standard
14 that I could look to?

15 A. No.

16 Q. ASTM or other kind of standard that this
17 is what reasonable fit means.

18 A. No. Like I said, it's a case-by-case
19 situation and it's relative.

20 Q. Is it also subjective?

21 A. It can be subjective. There are
22 considerations that go into it.

23 Q. I want to ask you for a minute about
24 calibration targets.

25 Are there established standards or

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1 guidelines in the fate and transport modeling
2 community for determining and applying specific
3 calibration targets?

4 A. No. We try to stay very close to the
5 measured data and have as many data as possible so
6 we can have a reliable calibration.

7 MS. BAUGHMAN: I'm going to object as
8 nonresponsive to everything after "no."

9 BY MS. BAUGHMAN:

10 Q. So there are no standards or guidelines
11 in your field for determining or applying
12 calibration targets; right?

13 A. There's no single standard, no.

14 Q. Have you used calibration targets for
15 your models?

16 A. Yes, I have.

17 Q. Did you use one for Hanford?

18 A. Many times.

19 Q. For chromium 6 concentrations?

20 A. I have to remember. Yes, I think so.

21 Q. What was it? What was your calibration
22 target?

23 A. Well, it depends. It was relative to
24 the values that we had. So it's not a single
25 number. It was a range, but I think it was

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1 also -- I'm trying to remember the actual
2 publication to remember what range was, but we're
3 trying to stay as close as possible. So it was a
4 subjective number. I don't think it was the --

5 Q. It was subjective, is that what you
6 said?

7 A. It is a subjective number.

8 Q. So is it your testimony that calibration
9 targets are subjective by definition?

10 A. Calibration targets look at how close we
11 get to the data. So we'll look at many different
12 things. We're looking at the type of gradient to
13 see how close they are. We're looking at well
14 levels, how close they are. We look at the
15 concentration trends and we try to get as close to
16 them as possible. There's no single way of
17 quantifying what is close and what is not. We all
18 look at it from different standpoints making sure
19 that we have a good fit. And that's subjective.

20 Q. If you could turn to page 31. You wrote
21 under Section 4.1, Tawara Terrace, the third full
22 paragraph, you wrote, "Based on my professional
23 judgment, there were insufficient data to conduct
24 reliable model calibration and uncertainty
25 analysis."

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1 Did I read that correctly?

2 A. Yes.

3 Q. Can you identify any textbook or
4 published literature that you are relying on for
5 your opinion that there were insufficient data to
6 conduct reliable model calibration and uncertainty
7 analysis?

8 A. I don't believe there's a document that
9 will give you a number of datapoints.

10 Q. What about a published standard in the
11 field, is there a published standard in the field
12 you're relying on for your professional judgment
13 and opinion that there were insufficient data to
14 conduct a reliable model calibration and
15 uncertainty analysis?

16 A. No. This is something we judge based on
17 professional judgment and experience.

18 Q. Can you tell me what your method was to
19 reach your opinion that there were insufficient
20 data?

21 A. I don't think it's a matter of method.
22 It's with respect to all my observations with
23 respect to how the model was constructed and
24 calibrated.

25 Q. What amount of data would have been

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1 sufficient at Tarawa Terrace to conduct a reliable
2 model calibration and uncertainty analysis?

3 MR. ANWAR: Object to form.

4 THE WITNESS: I'm afraid it's hard to
5 answer that question because almost everything in
6 the modeling that ATSDR did was based on
7 assumptions and not data. Please do not take that
8 literally. I mean, there were data, but the type
9 of data, the quality of the data, the frequency of
10 the data, the location of the data, these are all
11 important things with respect to the flow model.

12 When it comes to the transport model, we
13 had little to nothing especially for the period of
14 interest up to 1985 or '87. It was as if it was
15 like one or two datapoints and nothing to give us
16 a sense of the history that we can calibrate to.

17 MS. BAUGHMAN: I object as
18 nonresponsive.

19 BY MS. BAUGHMAN:

20 Q. Let's start with the flow model. What
21 amount of data would have been sufficient, in your
22 opinion, to conduct a reliable model calibration
23 and uncertainty analysis for the groundwater flow
24 data at Tawara Terrace?

25 MR. ANWAR: Object to form.

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1 THE WITNESS: I'm afraid I cannot answer
2 your question with a single number. I can provide
3 a qualitative answer if you'd like. I do have an
4 answer, but...

5 BY MS. BAUGHMAN:

6 Q. Can you tell me the amount of data that
7 would be sufficient for the groundwater flow data
8 at Tawara Terrace to conduct a reliable model
9 calibration and uncertainty analysis?

10 A. There's not a number that would answer
11 your question. It's about the quality of the
12 data.

13 Q. If you look at page 69 of your report.
14 By the way, when you talk about the quality of the
15 data, are you relying on any textbook or published
16 literature or standard for your professional
17 judgment regarding the quality of the data at
18 Tawara Terrace?

19 A. I'm referring to what is very well known
20 in our field as to the kind of data we need for a
21 transient model simulation and calibration. And I
22 think most people would agree on that.

23 Q. Is that published somewhere?

24 A. I have provided information in my report
25 regarding certain references, but otherwise, this

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1 is very much common knowledge. I'm not ready to
2 give you a reference. But it's one of those
3 things in our field we consider it self evident at
4 this point.

5 MS. BAUGHMAN: I'll object as
6 nonresponsive.

7 BY MS. BAUGHMAN:

8 Q. Turn to page 69. In the second full
9 paragraph, you say you have a similar opinion as
10 what we just talked about, but here it's for
11 Hadnot Point. You wrote, "Based on my
12 professional judgment, there was insufficient data
13 to conduct groundwater flow and contaminant
14 transport model calibration and uncertainty
15 analysis."

16 Correct? That's your opinion?

17 A. That is correct.

18 Q. If I ask you the same questions, like
19 can you identify a textbook or published
20 literature that you're relying on for this
21 opinion, you're going to give me the same answers;
22 right?

23 MR. ANWAR: Object to form.

24 THE WITNESS: Actually, I would refer to
25 you ATSDR statements about the availability of

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ALEXANDROS SPILIOTOPOULOS, PH.D.

1 data to conduct the calibration and uncertainty
2 analysis.

3 BY MS. BAUGHMAN:

4 Q. Can you cite me to a textbook or
5 literature that you're relying on with regard to
6 how much data is sufficient to conduct a
7 groundwater flow and contaminant transport model?

8 A. I don't believe there's a number
9 anywhere published or not.

10 Q. You did not cite the published
11 literature for this opinion; right?

12 A. No. I'm stating a fact in our industry.

13 Q. Similar to what we just looked at, if
14 you look at page 32 and then kind of put your
15 finger there and page 70, you have headings for
16 Tawara Terrace and for Hadnot Point that both say
17 "Available data are limited or nonexistent." Do
18 you see that?

19 A. One second. Yes.

20 Q. Let's look at the -- right after you say
21 Available data are limited or nonexistent for
22 Tawara Terrace, you say that there were horizontal
23 hydraulic conductivities from 36 aquifer test
24 analyses at Tawara Terrace and adjacent areas;
25 right?

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1 A. Correct.

2 Q. On page 70 you note that there were more
3 than 200 aquifer and slope test analyses; correct?

4 A. Correct.

5 Q. That's lot of data, isn't it?

6 MR. ANWAR: Object to form.

7 THE WITNESS: Depends on the context.

8 BY MS. BAUGHMAN:

9 Q. Aquifer tests are time consuming and
10 expensive, aren't they?

11 MR. ANWAR: Object to form.

12 THE WITNESS: Usually I believe for most
13 of these here, they're done routinely when that a
14 model well is installed.

15 BY MS. BAUGHMAN:

16 Q. I remember for Hanford, you said that
17 you had -- your aquifer tests were limited there;
18 right?

19 A. At the time, yes.

20 Q. Because they hadn't been done in the
21 past; right?

22 A. Some were done. This was still an
23 evaluation of the site. We're still under a site
24 characterization in many ways.

25 Q. Would you agree that ATSDR based its

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1 hydraulic properties for its models on
2 site-specific data?

3 MR. ANWAR: Object to form.

4 THE WITNESS: There are site-specific
5 data with respect to that, but again, I have to
6 provide context to my answer. I cannot just say
7 yes or no. Otherwise, I'm misrepresenting my
8 answer. Would you like to hear my answer?

9 BY MS. BAUGHMAN:

10 Q. I just want to know if you agree ATSDR
11 based its hydraulic properties for its models on
12 site-specific data. They used site-specific data,
13 didn't they?

14 A. They used these site-specific data, yes.
15 They considered them, yes.

16 Q. The flow model for Hadnot Point used
17 more than 700 water level measurements; right?

18 A. The number again is irrelevant. ATSDR
19 offered a statement on the quality of the
20 available data to perform the calibration, and
21 they indicated that it was not sufficient to
22 calibrate the model.

23 Q. You're saying that ATSDR said they had
24 insufficient data to calibrate their flow model?

25 A. They said that the calibration was

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1 limited because there were no data available
2 beyond two wells to calibrate the transient model.
3 I have a statement in my report on that. I
4 believe I quoted what ATSDR said in their report.

5 Q. Let's talk about the steady-state model.
6 They calibrated using that using more than 700
7 water measurement levels; right?

8 A. Yes, but very little water level data as
9 well. The model calibration is a complex process
10 that involves development of special distributions
11 or parameter. So the fact that you have some data
12 somewhere, it all depends on where you have them,
13 how many you have, how many water levels data you
14 have.

15 I can go on and on about the data
16 available at the time. You're giving me a number.
17 But I'm just saying that there are things that
18 were not available and that were important.

19 MS. BAUGHMAN: I'm going to object as
20 nonresponsive.

21 BY MS. BAUGHMAN:

22 Q. On page 77 of your report, under Section
23 4.2.3.1, you have a sentence where you state --

24 A. I'm sorry. Say that again. Which one?

25 Q. Page 77.

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1 A. 77. You're taking me to another page.
2 Give me a second to get that. Yes.

3 Q. Under 4.2.3.1, second sentences, "The
4 steady-state model" -- this is for Tawara
5 Terrace -- "constructed for simulating
6 predevelopment condition, i.e., ambient
7 groundwater flow in the absence of pumping, was
8 calibrated using more than 700 water level
9 measurements."

10 Correct? That's what you wrote?

11 A. That is correct, but, like I said, I
12 have to provide context on that. Otherwise, I'm
13 not sure the message gets across.

14 Q. Was the 700 water level measurement used
15 for the steady-state model an insufficient amount
16 of data for that calibration?

17 A. They were not even predevelopment data
18 because they were not available. They used data
19 over a long period of time at the times when the
20 wells were turned off, for example, during
21 remediation when there was no pumping.

22 So they compiled a large dataset from
23 different times. In the absence of predevelopment
24 data, they called that predevelopment to get some
25 sense of steady-state conditions in the aquifer.

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1 So right there that's one thing to consider.

2 Q. So your opinion that the 700 datapoints
3 used by ATSDR to calibrate the steady-state model
4 is an insufficient amount of data?

5 A. I'm not saying that. I'm saying the
6 data available provided some measurement. They
7 were not development, referring to period prior to
8 1942. They compiled data from different times.
9 But then I'm just stating that, because the most
10 important part in this model is the transient
11 state model, which reflects the aquifer response
12 to pumping.

13 MS. BAUGHMAN: Objection.
14 Nonresponsive.

15 BY MS. BAUGHMAN:

16 Q. You're doing it again. It's like here
17 you go again. You're not answering my questions.
18 Try to answer my questions.

19 You wrote in your report that the
20 steady-state model was calibrated using more than
21 700 water level measurements. I want to know for
22 that model was that an insufficient amount of
23 data, in your opinion?

24 MR. ANWAR: Object to form.

25 THE WITNESS: I cannot answer this

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1 question like that. I have to provide context.

2 If allow me, I can. Otherwise, I can just confirm
3 that what you read is correct.

4 BY MS. BAUGHMAN:

5 Q. I want to know whether the 700
6 datapoints used for the steady-state model was an
7 insufficient amount of data, in your opinion?

8 MR. ANWAR: Object to form.

9 THE WITNESS: I'm saying that where
10 they're coming from is important because they mix
11 and match different times. I have to give context
12 to my answer. Otherwise, I cannot answer
13 question.

14 BY MS. BAUGHMAN:

15 Q. Wherever they came from, I'm not saying
16 that they were predevelopment data. I'm not
17 saying that they were from last year. You wrote
18 in your report there were 700 datapoints.

19 Was that an insufficient amount of data
20 to calibrate the steady-state flow model?

21 MR. ANWAR: Object to form.

22 BY MS. BAUGHMAN:

23 Q. What is your opinion?

24 MR. ANWAR: Same objection.

25 THE WITNESS: I'm not sure they were

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ALEXANDROS SPILIOTOPOULOS, PH.D.

1 sufficient. I have reservations about the time
2 they were collected. But in any event, that's
3 fine. The important part is the transient state
4 model.

5 MS. BAUGHMAN: Objection. Nonresponsive
6 regarding transient state.

7 BY MS. BAUGHMAN:

8 Q. So your opinion on whether the 700
9 datapoints and whether those were sufficient to
10 calibrate the steady-state model, your answer is
11 you're not sure if that was sufficient; is that
12 right?

13 A. I don't have a particular opinion about
14 that.

15 Q. If you could turn to Exhibit 4, which is
16 the Chapter A from Tawara Terrace.

17 A. One second, please.

18 MR. ANWAR: Four I think is his report.

19 THE WITNESS: Are you referring to my
20 report?

21 BY MS. BAUGHMAN:

22 Q. Time out. No. Exhibit 4. Wait. Hold
23 on. I've got it. I have it misnumbered.

24 MR. ANWAR: Exhibit 9.

25

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1 BY MS. BAUGHMAN:

2 Q. Chapter A for Hadnot Point is what I'm
3 talking about, which is I guess Exhibit 9.

4 A. Exhibit 9?

5 Q. Yeah.

6 A. Okay.

7 Q. Turn to page A10.

8 A. Okay.

9 Q. Table A2 has the number and type of data
10 extracted from information sources and reviewed
11 for historical reconstruction analysis for Hadnot
12 Point Holcomb Boulevard and Tawara Terrace study
13 areas.

14 Do you see that?

15 A. Yes.

16 Q. Did you consider this table in your
17 opinions?

18 A. It refers to different sources and
19 different purposes. So I'm not sure how to answer
20 your question.

21 Q. So this chart tells us number and the
22 type of data that were extracted from information
23 sources and reviewed by the ATSDR team for its
24 historical reconstruction analysis; correct?

25 A. They were considered by ATSDR, yes.

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1 Q. Any reason to disagree with the numbers
2 set forth in Table A2?

3 A. It's probably right. I'm assuming it's
4 accurate. I'm not sure. I haven't looked at them
5 one by one.

6 Q. For example, ATSDR reports here that for
7 its modeling analysis at Hadnot Point and Holcomb
8 Boulevard, they reviewed 13,133 water level
9 measurements; correct?

10 A. You read the number correctly there.

11 Q. And they also reviewed for Tawara
12 Terrace 789 water level measurements; right?

13 A. Correct.

14 Q. And for Hadnot Point and Holcomb
15 Boulevard, they had groundwater samples analyzed
16 for chlorinated solvents. There were 4,104
17 samples; correct?

18 A. All types of samples, yes.

19 Q. For chlorinated solvents.

20 A. That's what they're stating and that's
21 correct.

22 Q. And 192 for Tarawa Terrace; right?

23 A. Yes.

24 Q. And wells hydropunch points and
25 boreholes, for Hadnot Point and Holcomb Boulevard,

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ALEXANDROS SPILIOTOPOULOS, PH.D.

1 they reviewed 1,979 different data values;
2 correct?

3 A. That's what the table says.

4 Q. For Tawara Terrace 222; correct?

5 A. The approximate number of data values it
6 says there, yes, I agree.

7 Q. For Hadnot Point and Holcomb Boulevard,
8 they had 264 datapoints for supply well and
9 monitor well aquifer and slug tests; right?

10 A. That's what it's stated in the table;
11 correct.

12 Q. For Tawara Terrace, 33; right?

13 A. That's what the table says; correct.

14 Q. Did you review all of this data that
15 I've just talked about? Did you actually pull up
16 the data and review, for example, the 13,833 water
17 level measurements for Hadnot Point?

18 A. No.

19 MR. ANWAR: Object to form.

20 BY MS. BAUGHMAN:

21 Q. ATSDR used a test analysis for prior
22 estimation for Hadnot Point; right?

23 A. For calibrating the full model I
24 believe, yes.

25

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ALEXANDROS SPILIOTOPOULOS, PH.D.

1 Q. Well, didn't they use a test to
2 calibrate the predevelopment model for Hadnot
3 Point?

4 A. Yes.

5 Q. Are you aware that John Doherty assisted
6 them with that analysis?

7 A. I don't know how he assisted them or
8 whether he provided instructions. My
9 understanding is that he provided a short course
10 on how to use PEST. That was my understanding.

11 Q. Were you aware that he visited with the
12 ATSDR people for a week and assisted them with
13 this PEST analyses for Hadnot Point?

14 A. I don't know if he assisted them.

15 Q. You don't know? John Doherty is the man
16 who developed PEST; is that right?

17 A. Yes. I know him personally.

18 Q. Is he associated with Papadopulos &
19 Associates?

20 A. He has been under different forms and
21 shapes, yes.

22 Q. Is he now?

23 A. I'm not sure actually.

24 Q. You've used PEST; right?

25 A. Extensively.

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ALEXANDROS SPILIOTOPOULOS, PH.D.

1 Q. What is it? Just in short form, what is
2 PEST?

3 A. It's a computational method of
4 considering the model structure and using
5 calibration data or targets, adjust model
6 parameters, properties so that the model can match
7 to the extent possible the observed data.

8 Q. Have you reviewed the PEST analysis that
9 was done by ATSDR at Hadnot Point?

10 A. The analysis itself you mean?

11 Q. Yes.

12 A. No, I have not.

13 Q. Do you know which parameter of values
14 ATSDR calibrated using PEST for Hadnot Point?

15 A. I don't recall which parameters, but I
16 would assume hydraulic conductivity.

17 Q. Would you agree using PEST to calibrate
18 hydraulic conductivity is a reliable methodology?

19 MR. ANWAR: Object to form.

20 THE WITNESS: PEST is a reliable tool to
21 be used for analysis, the analysis performed by a
22 hydrogeologist, and the data to be used or judged
23 accordingly.

24 BY MS. BAUGHMAN:

25 Q. Do you have an opinion on whether ATSDR

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1 used PEST reliably in calibrating hydraulic
2 conductivity at Hadnot Point?

3 A. For the predevelopment model?

4 Q. Yes.

5 A. No. I don't know.

6 Q. You don't know, is that what you said?

7 A. I'm not familiar with the work they did.
8 I did not review their calibration.

9 Q. So as you sit here today, do you have
10 any criticisms of ATSDR's use of PEST at Hadnot
11 Point?

12 A. That's a very general statement. I'm
13 saying that the importance there is on the
14 transient model, and for that the ATSDR said that
15 they had practically no data to calibrate the
16 model, and that's the model that was used for the
17 calculation. So what the predevelopment model
18 does --

19 MS. BAUGHMAN: Objection.
20 Nonresponsive.

21 BY MS. BAUGHMAN:

22 Q. As you sit here today, do you have any
23 criticisms of how ATSDR used PEST at Hadnot Point?

24 MR. ANWAR: Object to form.

25 THE WITNESS: Again, I don't have an

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1 opinion on how they used PEST.

2 BY MS. BAUGHMAN:

3 Q. Is it your opinion that ATSDR had
4 limited data regarding the geologic
5 representations at Hadnot Point?

6 A. I'm sorry. Could you repeat the
7 question?

8 Q. Is it your opinion that ATSDR had
9 limited data regarding geologic representations at
10 Hadnot Point?

11 A. What do you mean by representations?
12 What was built into the model? I'm not sure I
13 understand the question.

14 Q. The hydrogeologic framework.

15 A. There were several assumptions that were
16 made with respect to hydrogeologic framework based
17 on the data, and ATSDR discusses that especially
18 with respect to the model construction.

19 Q. Do you agree that ATSDR had 931
20 datapoints available to describe the hydrogeologic
21 framework?

22 A. Where do you see that number?

23 Q. Do you know how many they had?

24 A. I don't remember the number by heart.

25 Q. Do you agree that for Hadnot Point for

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1 the level three calibration, ATSDR included data
2 from the 1990s and also from 2000 to 2008?

3 MR. ANWAR: Object to form.

4 THE WITNESS: Where do you see that just
5 to make sure that I concur to the right numbers?

6 BY MS. BAUGHMAN:

7 Q. Let's look at page 77 of Mr. Maslia's
8 report. That's Exhibit 10.

9 A. What page was that?

10 Q. 77.

11 A. Hold on a second. 77 you said. I see
12 page 76. 77 is this statement. Okay. Where is
13 that number again?

14 Q. So --

15 A. I don't see that number.

16 Q. There were four remediation extraction
17 wells that were installed over a decade after
18 HP651 was decommissioned, do you see that, to
19 cleanup the groundwater?

20 A. Excuse me one second. Can I find that
21 on the page. You said page 77 of his expert
22 report.

23 Q. That's right. The second paragraph.

24 A. Where are you looking at?

25 Q. The additional panels in Figure 7.12

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1 represent four remediation extraction wells.

2 A. Yes.

3 Q. 7.21 is on the next page if you need to
4 see it. That were installed over a decade after
5 HP651 was decommissioned to clean up the
6 groundwater during USEPA installation/restoration
7 program.

8 Do you agree with me that for the level
9 3 calibration for Hadnot Point, ATSDR used both
10 the data in the early 1980s that it had and it
11 used data from these four remediation wells from
12 the 2000 to 2008 timeframe?

13 A. Your statement is correct.

14 Q. Is it your opinion that these two sets
15 of data from the '80s and then from 2000 to 2008
16 were an insufficient amount of data to calibrate
17 in level 3 for Hadnot Point?

18 A. Yes.

19 (Spiliotopoulos Exhibit 15 was marked.)

20 BY MS. BAUGHMAN:

21 Q. Let's turn to Tawara Terrace, Chapter A.

22 So Exhibit 15, Chapter A: Summary
23 Findings from Tawara Terrace; correct?

24 A. Yes.

25 Q. If you could turn to page A26.

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1 A. Okay.

2 Q. Page A26 provides a Table 8A, provides a
3 summary of calibration targets and resulting
4 calibration statistics for simulation models used
5 to reconstruct historical contamination events at
6 Tawara Terrace and vicinity; correct?

7 A. Yes.

8 Q. So to calibrate level one, the
9 predevelopment groundwater flow model, ATSDR had
10 59 separate paired datapoints; correct?

11 MR. ANWAR: Object to the form.

12 THE WITNESS: That's what the table
13 says.

14 BY MS. BAUGHMAN:

15 Q. Is that not true? Do you have a reason
16 to believe that's not correct?

17 A. I don't think so. I'm just stating the
18 fact this is what the table says.

19 Q. Calibration level two, for Tawara
20 Terrace, ATSDR had 263 transient groundwater flow
21 monitor well paired datapoint and 561 transient
22 groundwater flow supply well paired datapoints;
23 correct?

24 A. Correct.

25 Q. For the fate and transport level three,

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1 they had 36 paired datapoints; correct?

2 A. Correct.

3 Q. And for level four at the treatment
4 plant, they had 25 paired datapoints; correct?

5 A. That's what the table says, yes.

6 Q. Did you review all of these pair
7 datapoints as part of your work on the case?

8 MR. ANWAR: Object to form.

9 THE WITNESS: I looked at the tables
10 that ATSDR provided for looking at these
11 differences. I looked at the timing of the data
12 available. And I also considered ATSDR's own
13 statements about the number of data available and
14 the quality of those data.

15 BY MS. BAUGHMAN:

16 Q. So you said you considered the timing of
17 the data available. For the groundwater flow
18 model, the transient flow model for Tawara
19 Terrace, they had four decades of data available
20 for that calibration; right?

21 MR. ANWAR: Object to form.

22 THE WITNESS: Actually, that is not
23 correct and I can look at where -- there are that
24 you remember data that span a long period, but the
25 majority of the data are coming from 1978 or so,

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1 if I remember correctly, for the pumping wells.

2 And ATSDR provided some graphs to compare the
3 observed and simulated values for those wells.

4 BY MS. BAUGHMAN:

5 Q. Let's go to Mr. Maslia's report and look
6 at page 50.

7 A. Yes.

8 Q. If you flip to page 49, we can see what
9 he's talking about here is level two calibration,
10 right, transient conditions; correct?

11 A. Yes.

12 Q. Turn to the next page. He says input
13 parameter are calibrated to minimize deviations
14 between simulations and observed calibrations. He
15 says, "It should be noted that four decades of
16 data were available for this calibration, from
17 1951 to 1994."

18 Now, is that correct ATSDR had four
19 decades of data available for that transient flow
20 calibration?

21 MR. ANWAR: Object to form.

22 THE WITNESS: They had data from that
23 timeframe, yes.

24 BY MS. BAUGHMAN:

25 Q. Let's flip back again. We were just

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1 looking at Exhibit 15, Chapter A from Tawara
2 Terrace, Table A8.

3 A. Table A8.

4 Q. On page A26, the one we were just
5 looking at.

6 A. Okay.

7 Q. Is it your opinion that the 59 paired
8 datapoints that ATSDR had available to calibrate
9 its predevelopment groundwater model, that that
10 was an insufficient amount of data to perform that
11 calibration?

12 A. I believe that the number of datapoints
13 is somewhat irrelevant when we look at this model
14 and its calibration. There are additional
15 considerations before we answer that question.

16 Q. Is it your opinion that there were
17 insufficient data for the ATSDR to calibrate its
18 predevelopment groundwater flow model for Tawara
19 Terrace?

20 A. I believe so, yes.

21 Q. And how much data would have been
22 necessary to calibrate that groundwater,
23 predevelopment groundwater flow model?

24 MR. ANWAR: Object to form.

25 THE WITNESS: There's not an answer to

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1 your question that comes with a particular number.

2 BY MS. BAUGHMAN:

3 Q. So what is your criticism of the 59
4 paired datapoints used by ATSDR to calibrate the
5 predevelopment groundwater flow model?

6 A. First of all, they're not true
7 predevelopment data for starters. They're coming
8 from different times within a very long period of
9 time, from I want to say the '50s if there is a
10 one there, and everything else it's much, much
11 later over the actual period through '85 and
12 beyond during the remediation period. So it comes
13 from decades.

14 Q. What's the other criticism?

15 A. Well, in and by itself, this is not
16 predevelopment to begin with. So it doesn't
17 necessarily reflect the conditions.

18 Q. Do you have another criticism?

19 A. In terms of the number of datapoints?

20 Q. In terms of why you I think datapoints
21 were insufficient?

22 A. The location of these datapoints.

23 Q. What's the problem with the location?

24 A. Well, I'm not sure that they cover the
25 entire area of interest. This is a very big

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1 model.

2 Q. Did you map that out to see?

3 A. I believe I looked at those on the map,
4 yes.

5 Q. Anything else?

6 A. For the predevelopment?

7 Q. Yeah.

8 A. No. Basically this is what I have for
9 that.

10 Q. For the transient groundwater flow model
11 for Tawara Terrace, why do you believe that the
12 263 transient groundwater flow monitoring well
13 paired datapoints and the 526 transient
14 groundwater for a supply well paired datapoints,
15 is it your opinion that's insufficient data to
16 calibrate that model?

17 A. That comes hand in hand with all the
18 other information that goes into the model. The
19 model is calculating water levels on a monthly
20 basis. These transient water level values do not
21 capture the variability in aquifer response to
22 pumping at different times. It just gives us
23 snapshots at water levels at different locations.
24 So for the frequency of model output and
25 the level of detail that this model is intended

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1 for, this is not sufficient information. We
2 should have continuous data at certain locations
3 to see how aquifer responds to pumping. So this
4 is definitely not enough.

5 Q. How much data would have been needed?

6 A. Again, it's not about the number of
7 data. It's the location and the type of data.

8 Q. So where were the locations of these
9 more than 800 datapoints that they used for
10 paired? What locations were missing?

11 A. The groundwater flow supply wells, again
12 the well itself is not -- a water supply well, you
13 turn it off and you get a measurement. You don't
14 have continuous data there to give you --

15 Q. I'm asking about location now.

16 A. I'm saying that there should be, first
17 of all, monitoring wells across the domain. That
18 would be preferable. So there's a level of
19 uncertainty there. And the data we use were
20 coming primarily from supply wells, which were
21 turned off at some point and a measurement was
22 taken.

23 So we have no idea what the variability
24 of water levels in the aquifer was near those
25 wells or in the graded area.

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1 Q. There were also 263 paired data the
2 monitoring wells. What's your criticism of that?

3 A. Because the number of stress periods
4 that we have is much bigger than that in the
5 model. And so by no means do these datapoints
6 capture the variability of pumping in the aquifer.
7 That is constructed in the -- that is incorporated
8 in the model which is monthly output.

9 Q. So how many datapoints would have been
10 needed?

11 A. Many more than that and at different
12 locations and over continuous periods of time to
13 allow the modeler to calibrate the model to the
14 aquifer response because we're pumping on a
15 monthly basis.

16 Q. Can you give me a number?

17 A. No.

18 Q. Can you give me a citation to literature
19 that supports your opinion that data -- that there
20 were insufficient paired datapoints for the
21 predevelopment or transient groundwater flow
22 models for Tarawa Terrace? What literature are
23 you relying on?

24 A. I don't believe that there's any
25 literature source that would give you that answer.

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1 Q. What standard in your field are you
2 relying on?

3 A. It's common practice in our field that
4 that to calibrate a phantom model, they need
5 transient data.

6 Q. Do you have an ASTM standard or some
7 other standard that you're relying on for your
8 opinions regarding insufficiency of data?

9 A. I do not remember whether that's even
10 stated there, but again, that's common practice in
11 our field. And I believe -- I probably have to go
12 back to even Anderson and Wuzner to find something
13 to that effect.

14 Q. As you sit here today, can you cite a
15 standard in your field that ATSDR violated
16 regarding the sufficiency of data used to
17 calibrate the Tawara Terrace model?

18 MR. ANWAR: Object to form.

19 THE WITNESS: Off the top of my head, I
20 cannot.

21 BY MS. BAUGHMAN:

22 Q. Is it in your report?

23 A. We'll have to see where something like
24 that would have been stated. I will have to
25 check.

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ALEXANDROS SPILIOTOPOULOS, PH.D.

1 Q. You can't identify it as you sit here
2 today?

3 MR. ANWAR: Object to form.

4 THE WITNESS: Again, I would say that
5 any hydrogeologist would agree on that.

6 BY MS. BAUGHMAN:

7 Q. Page 32 of your report.

8 A. What page again?

9 Q. 32. You wrote in the middle of the
10 page, "To construct the contaminant transport
11 model, ATSDR used model parameters that were based
12 on a literature review and the professional
13 judgment of the modelers."

14 Do you see that?

15 A. Yes.

16 Q. You have a similar statement on page 70
17 regarding Hadnot Point. My question is you're
18 basing model parameters on published literature
19 and improper methodology in your field?

20 MR. ANWAR: Object to form.

21 THE WITNESS: It's usually the starting
22 point in our analysis.

23 BY MS. BAUGHMAN:

24 Q. Then calibration after that; right?

25 A. Considering site-specific data.

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1 Q. What is your basis for criticizing the
2 use of published literature to inform model
3 parameters?

4 MR. ANWAR: Object to form.

5 THE WITNESS: Literature sources is a
6 good starting point as a reality check with
7 respect to the values we're using. But again,
8 site-specific data are the way to go in terms of
9 testing whether the values we're using are
10 appropriate for the particular conditions that
11 we're trying to model.

12 MS. BAUGHMAN: Object to the
13 nonresponsive portion.

14 BY MS. BAUGHMAN:

15 Q. Are there any standards outlining the
16 parameters that can and cannot be based on
17 literature in your field?

18 A. I'm not sure I understand your question.

19 Q. Are there any standards in your field
20 that say which parameters can and cannot be based
21 on literature?

22 A. I'm not sure how to answer this
23 question. No, there's nothing that says that you
24 can or cannot. Literature sources provide a basis
25 when you look at conditions that you have at hand

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1 with similar conditions from literature. And then
2 site-specific data confirm how far or close we are
3 to those values. And then model calibration
4 refines that estimate.

5 Q. So you didn't cite any textbook or
6 literature or anything else for your opinion that
7 supporting ATSDR should not have used literature
8 review and professional judgment with respect to
9 model parameters; correct?

10 A. That's not what I said in my report. I
11 said that's the only thing they relied on and they
12 did not consider site-specific data.

13 Q. You're saying ATSDR didn't consider any
14 site-specific data at all in establishing any
15 parameter for Tawara Terrace; is that true? Is
16 that what you're saying?

17 MR. ANWAR: Object to form.

18 THE WITNESS: No, that's not what I
19 said.

20 BY MS. BAUGHMAN:

21 Q. So which parameters did they not use
22 site-specific data for?

23 A. For the transport parameters, the value
24 of Kd.

25 Q. Anything else?

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1 A. Porosity, bulk density. The reaction
2 rate was based on the pair of values. So
3 certainly not enough to calibrate the model.
4 These are the ones that come to mind right off the
5 bat.

6 Q. Anything else?

7 A. That's all I can think right now.

8 Q. Are there any standards in your field
9 that say one cannot use professional judgment to
10 set model parameters?

11 MR. ANWAR: Object to form.

12 THE WITNESS: Of course, we use
13 professional judgment all the time.

14 BY MS. BAUGHMAN:

15 Q. Professional judgment is used all the
16 time to calibrate groundwater models; right?

17 A. That's an incomplete statement. We use
18 professional judgment, and then we rely on
19 site-specific data and observations to calibrate a
20 model.

21 Q. Are there any standards outlining the
22 parameters that can and cannot be based on an
23 engineer's professional judgment in your field?

24 MR. ANWAR: Object to form.

25 THE WITNESS: Again, it's not about what

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1 can or cannot be used. It's how our assumptions
2 and inputs into the model are checked against
3 observed data or site-specific data to begin with
4 to determine whether our calibration is good
5 enough.

6 MR. ANWAR: Whenever you're at a good
7 spot to take a break, there are people in the
8 waiting room as well. We've been going for about
9 an hour.

10 MS. BAUGHMAN: We can take a break.

11 THE VIDEOGRAPHER: Off the record 1711.

12 (Recess from 5:11 p.m. to 5:17 p.m.)

13 THE VIDEOGRAPHER: On the record at
14 1717.

15 BY MS. BAUGHMAN:

16 Q. Dr. Spilotopoulos, can you identify any
17 site-specific data for Tawara Terrace or Hadnot
18 Point that you believe ATSDR should have
19 considered and didn't in its modeling?

20 A. The most obvious one was the Kd, the
21 distribution coefficient. There were data
22 available. They were not considered and as a
23 result, ATSDR used professional judgment, but also
24 made some errors that resulted in low values.

25 Q. Anything other than that?

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1 A. Bulk density was another mistake that
2 was made, and it was later corrected as far as I
3 understand. But it was an error that impacted the
4 uncertainty analysis.

5 MS. BAUGHMAN: I'm going to object as
6 nonresponsive.

7 BY MS. BAUGHMAN:

8 Q. Let's focus on the question. Is there
9 site-specific data that was available that ATSDR,
10 in your opinion, should have used in its modeling
11 and didn't use? Can you identify that data?

12 A. I believe the coefficient is one of
13 them, Kd, yes.

14 Q. Anything else?

15 A. I don't know that that I know if others
16 were available.

17 Q. Can you identify any other site-specific
18 data that was available to ATSDR and that they did
19 not use or should have used, in your opinion?

20 A. Possibly not, but I'm not sure. I
21 haven't exhaustively checked that.

22 Q. If you turn to page 16 of your report.

23 A. Yes.

24 Q. The last paragraph right before Section
25 3.3, in the second sentence, you wrote, "However

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1 assumptions and/or parameter values used by ATSDR
2 in constructing these models were incorrect or
3 inconsistent with site-specific data."

4 Do you see that?

5 A. Yes.

6 Q. Can you identify the assumptions and the
7 parameter values that you believe were incorrect
8 or inconsistent with site-specific data? Please
9 tell me which ones.

10 A. And we're talking about the Tawara
11 Terrace model; correct?

12 Q. Either one, both.

13 A. Assumptions and parameters that I
14 consider incorrect or inconsistent with
15 site-specific data, you would like a list?

16 Q. Right.

17 A. For Tawara Terrace, the start of mass
18 loading in the aquifer; the Kd value. Let me
19 think about this, make sure I provide a correct
20 answer. The assumption that there were no losses
21 at the treatment system, although this was not
22 part of the model itself. It was part of the
23 calculation of what went to the customer. The
24 bulk density value that was used for Tawara
25 Terrace and, hence, the retardation factor. I

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1 would stop at that.

2 Q. So just going back, this was the list of
3 the assumptions and parameter values that were
4 incorrect and inconsistent with site-specific
5 data; right?

6 A. Yes.

7 Q. So what was the site-specific data that
8 was inconsistent or incorrect with respect to the
9 start of the mass loading rate?

10 A. The fact that we have -- I consider the
11 information we have on when we believe that
12 actually operations started and, therefore,
13 potential contamination into the ground commenced.

14 Q. So the site-specific data you're talking
15 about there is what was in the other expert's
16 report?

17 A. Yes.

18 Q. And the site-specific data on the VOC
19 loss, is that what you're referring to that's in
20 Dr. Hennessey's report?

21 A. Correct.

22 Q. On page 69 of your report, you have a
23 sentence regarding Hadnot Point.

24 A. I'm sorry to amend my previous answer.
25 I think site-specific data would also apply to the

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1 pumping rates of the wells as applied in both
2 models.

3 Q. So what was the site-specific data on
4 the pumping?

5 A. Well, ATSDR developed a scheme where it
6 assigned flow rates to each well for every stress
7 period of the model every month. Very little to
8 nothing was known about the majority of time for
9 the operation of those wells. So that was an
10 assumption.

11 Q. What site-specific data is that
12 inconsistent with?

13 A. Well, that would be actual information
14 about the operation of those wells. I'm
15 suggesting that that was an assumption.

16 Q. But is that assumption inconsistent with
17 site-specific data that you have available to you
18 or that ATSDR had available to it?

19 A. Well, that's what I'm -- the context of
20 my answer there is that there are some data, and
21 then ATSDR developed a technique to take out of
22 bulk value specific flow rates for the wells. And
23 so --

24 Q. But is what ATSDR did inconsistent with
25 existing site-specific data for pumping?

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1 A. Not to the extent that there are
2 available data for those times and those were not
3 used. It's more about how they were developed
4 with respect to available site-specific data.

5 Q. ATSDR used all of the available data
6 regarding pumping that it had available to it;
7 right? It didn't ignore data, did it?

8 A. I don't believe that they did.

9 Q. If you turn to page 69, that's what we
10 were just talking about, in the third full
11 paragraph it starts, "Given the fact..." Do you
12 see that?

13 A. Um-hum.

14 Q. I'm going to ask you about the second
15 sentence. You wrote, "ATSDR's sensitivity and
16 uncertainty analysis evaluated a range parameters
17 values, some of which when compared to site
18 specific value did not reflect the site
19 conditions."

20 Which of the parameter values when
21 compared to site-specific data did not reflect the
22 site conditions?

23 A. Well, I believe that I have a table
24 where I'm indicating the kind of values that ATSDR
25 used for the sensitivity analysis that were way

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1 outside the range of values that were developed
2 either based on site-specific data or what they
3 considered otherwise as the mean values as
4 reasonable for the site.

5 For example, I will have to go to the
6 actual page. I have that there. I'm actually
7 providing some numbers here, and I'm saying that
8 for the hydraulic conductivity, they used values
9 equals to .1 or 10 times the calibrated value.
10 That was way outside a reasonable range of values
11 across the model.

12 Q. Inconsistent with site-specific data?

13 A. Well, for the distribution of those
14 values across the entire aquifer, yes.

15 Q. What page are you on there?

16 A. Page 87. In fact, I believe that ATSDR
17 indicated that the values would range somewhere
18 between 1 and 50 feet per day, and I have a
19 reference for that period. We can look at it.
20 They use values 0.1 or 500 feet per day.

21 Q. Go to page 36 of your report. You wrote
22 right above Section 4.1.2.1, you have this
23 statement. "In this section I focus on certain
24 assumptions and parameters due to their
25 significant impact on the model results. It

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1 should be noted that this discussion is not
2 intended to be inclusive of all assumptions or
3 parameters I believe were inappropriately
4 selected."

5 Are there any others that you can
6 identify today that you left out of your report
7 that you intend to testify about at a hearing or
8 at the trial of this matter?

9 A. I'm not sure I'm ready to offer an
10 opinion on that. I will focus on the ones that I
11 provided in my report.

12 Q. You understand that when you wrote the
13 expert report, you were supposed to include all of
14 your opinions and the basis for your opinions in
15 the report; right?

16 A. Yes.

17 Q. Flip to page 92 of your report.

18 A. Okay.

19 Q. You wrote toward the bottom of the first
20 paragraph under Concluding Remarks, you wrote,
21 "Similarly to Tawara Terrace, there is no observed
22 system behavior, i.e., historical data from the
23 entire period of interest to support a reasonable
24 and accurate model calibration."

25 Do you see that?

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1 A. Yes.

2 Q. Are you saying here that historical data
3 from the entire period of interest is required in
4 order to have a reasonable and accurate model
5 calibration?

6 A. I'm saying the data from the historical
7 period are necessary to test the accuracy of the
8 model results, some data. I'm not offering an
9 opinion as to how many or when, but certainly
10 within that timeframe, it would need more data.

11 Q. So you didn't cite any textbook or
12 manual or authority for that opinion; right?

13 A. I'm not sure there is even one out
14 there. I'm not that I'm aware of. But again,
15 this is common knowledge.

16 Q. Is it your opinion that to
17 reconstruct -- to do a historical reconstruction,
18 it's required to have concentration data for the
19 entire historical period?

20 A. I'm saying we should have some
21 site-specific data to rely upon and not assume
22 their values. There should be some observation
23 data so we can test the concentration levels over
24 time, something to that effect, because in this
25 particular case, I think I demonstrated by just

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1 tweaking one parameter value, we get a completely
2 different calibrated model that is equally
3 plausible, and it was not within the uncertainty
4 range that ATSDR produced that gave me less
5 confidence in the model.

6 Q. So the citations in your report, the
7 textbooks you rely upon, they recognize historical
8 reconstruction as being valid. It's a valid
9 methodology; right?

10 MR. ANWAR: Object to form.

11 THE WITNESS: That's a very vague
12 statement. Yes, historical reconstruction can be
13 done, has been done, yes.

14 BY MS. BAUGHMAN:

15 Q. Is there any reference you can cite to
16 that says you have to have concentration data from
17 the entire historical period to do a historical
18 reconstruction?

19 A. No. I'm demonstrating in this
20 particular case, that was not done properly
21 because I could demonstrate that. I could get a
22 completely different answer.

23 Q. So what you're saying there is that --
24 you're talking about nonuniqueness; right?

25 A. Yes.

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1 Q. Isn't it always true that water models
2 are nonunique?

3 A. That's a very general statement, and
4 that is true.

5 Q. In other words, nonuniqueness is not
6 limited to or unique to ATSDR's Camp LeJeune
7 models; right?

8 A. I can provide an answer with respect to
9 the particular model. A blanket statement
10 otherwise might misconstrue my opinion.

11 MS. BAUGHMAN: What? I'll object as
12 nonresponsive.

13 BY MS. BAUGHMAN:

14 Q. You wrote on page 41 of your opinion,
15 the very last sentence on page 41, you wrote,
16 "While professional judgment is essential in model
17 construction, it cannot guarantee model accuracy
18 absent these data." Right?

19 A. I'm sorry. Can you point me again. The
20 last paragraph?

21 Q. The last paragraph, the last sentence.

22 A. Yes.

23 Q. Cannot guarantee model accuracy.

24 Is there any model that can guarantee
25 accuracy, any groundwater model?

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1 A. There are different levels of accuracy
2 that we can evaluate.

3 Q. Which level of accuracy that's required
4 in this case, do you know?

5 A. What I showed is that by just tweaking
6 one parameter, I get a completely different
7 calibration. So I cannot even test the accuracy
8 of the model to say whether it's good or not.

9 MS. BAUGHMAN: Objection.

10 Nonresponsive.

11 BY MS. BAUGHMAN:

12 Q. What you're saying is the model is not
13 unique; right?

14 MR. ANWAR: Object to form.

15 THE WITNESS: Models are not unique,
16 that's correct.

17 BY MS. BAUGHMAN:

18 Q. No models are unique, are they?

19 MR. ANWAR: Object to form.

20 THE WITNESS: Again, very vague, general
21 statement. Yes.

22 BY MS. BAUGHMAN:

23 Q. But it's true, isn't it?

24 A. Yes. Models are nonunique, of course.

25 Q. Now, let's go back. You're talking

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1 about guaranteeing model accuracy. Have you ever
2 guaranteed to any of your clients that your model
3 is accurate?

4 A. What I provide to my clients is models
5 where the accuracy can be tested with respect to
6 data, and I illustrate the kind of accuracy that
7 they provide. Here I cannot provide any such
8 statement.

9 Q. So the Hanford model, the one that we
10 marked as an exhibit, that paper we talked about,
11 you didn't guarantee the accuracy of your chromium
12 6 concentrations; right?

13 A. Of course, not. That was not in the
14 scope of that calculation. It's was not expected.

15 Q. What's the standard if court is to judge
16 ATSDR's model? How accurate is it supposed to be,
17 do you know?

18 MR. ANWAR: Object to form, foundation.

19 THE WITNESS: I'm looking at the
20 accuracy of this model, and I say I cannot even
21 test it. So it's not a matter of providing a
22 level of accuracy.

23 MS. BAUGHMAN: Object as nonresponsive.

24 BY MS. BAUGHMAN:

25 Q. Do you know what the standard is in this

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1 case for accuracy?

2 MR. ANWAR: Same objection.

3 THE WITNESS: My understanding is that
4 the ATSDR model is supposed to provide monthly
5 concentrations over a long period of time. And
6 ATSDR also calculates the uncertainty range of
7 that, therefore, suggesting that the potential
8 values of contamination in any month, in any given
9 month is within that range. And I'm saying with
10 respect to that, I can prove that there are so
11 many other models that can actually produce very
12 different results outside that range. Therefore,
13 the accuracy of the model cannot be tested,
14 especially in the absence of any data to test
15 that.

16 MS. BAUGHMAN: Objection.

17 Nonresponsive.

18 BY MS. BAUGHMAN:

19 Q. Let's turn to Morris Maslia's report,
20 Exhibit 10, at page 59. I want to ask you about a
21 couple statements that Mr. Maslia made. I'm
22 looking at the past paragraph on page 59 in the
23 sending sentence. He wrote, "The observed data
24 used for calibration included all available
25 geologic data, supply well characteristics and

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1 observed well contaminant values."

2 Do you know whether that's true, that he
3 used all the available data for calibration at
4 Tawara Terrace?

5 A. All available is a blanket statement. I
6 would tend to think they considered the data
7 available. I'm fine with the statement.

8 Q. You're fine with that. Okay.

9 A. Although having said that, I'm saying --
10 hold on a sec. That ignores site-specific data
11 that I pointed out, for example, the distribution
12 coefficient that was not considered. So I don't
13 know if that falls in the category of everything
14 you looked at there.

15 Q. And he's referring to Figure 7.13, which
16 is on page 55 if you need to look at it, but he
17 says, "The observed values at Figure 7.13
18 represent the measured concentration statement
19 about the Tawara Terrace water treatment plant and
20 at other locations in Tawara Terrace water
21 distribution system."

22 But then he says, "It is important to
23 note these observed values were not used in the
24 calibration process and, therefore, represent an
25 additional set of observed field data by which to

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1 assess the goodness and fit of the four-level
2 hierarchical calibration process."

3 I want to ask you about that. Is it
4 your understanding that the values at the water
5 treatment plant for Tawara Terrace were not used
6 in the calibration process. Is that true?

7 A. That's my understanding.

8 Q. Instead, ATSDR used those values as an
9 additional set of data to assess the goodness of
10 fit; right?

11 A. That's what Mr. Maslia said.

12 Q. And did the same thing. Same process
13 was used for Hadnot Point; right?

14 A. That is true.

15 Q. Different subject. There is a criticism
16 that you and/or Mr. Hennet have made about
17 TT-26-26 and when it was and wasn't operating.

18 Do you recall that?

19 A. I don't think I made a statement about
20 the operation of TT-26.

21 Q. In your report, if we can turn to page
22 38 and 39.

23 A. Yes.

24 Q. You in your summary of opinions 2 and 3
25 at the bottom of the page, you say, "Parameter

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1 values in the Tawara Terrace model were different
2 than those in the Hadnot Point model -- you
3 started in this page and go to the next page --
4 even though both models stimulated similar
5 hydrogeologic conditions."

6 Do you see that?

7 A. Yes.

8 Q. It your opinion that Tawara Terrace and
9 Hadnot Point had the exact same hydrogeologic
10 conditions?

11 A. Very similar conditions.

12 Q. Did you review the hydraulic
13 conductivity measurements from the two sites?

14 A. I looked at the values, yes, and some
15 distributions depending on the layer, yes.

16 Q. Did the hydraulic conductivity
17 measurements indicate differences in aquifer for
18 material properties for the two sites?

19 A. It depends on the layer and the
20 location. Range-wise they appeared very similar.

21 Q. But there were differences, weren't
22 there?

23 A. There are always different. Especially
24 we see that in the Tawara Terrace model itself.

25 Q. Are you aware of any textbook or

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1 literature that supports calibrating two separate
2 models for two different sites with the same
3 parameter values just because they're adjacent to
4 each other?

5 MR. ANWAR: Object to form.

6 THE WITNESS: I don't think there is any
7 document that would suggest something like that.

8 BY MS. BAUGHMAN:

9 Q. For Hanford, didn't parameter values
10 vary at different parts of the site even when they
11 were contiguous?

12 A. Of course.

13 Q. Did you read the rebuttal report of
14 Dr. Konikow?

15 A. Yes.

16 Q. If you could turn to page 10 of
17 Dr. Konikow's report, if you look at the large
18 paragraph in the middle, toward the bottom there,
19 it states In Summary. It says, "In summary, the
20 two specific possible errors cited by
21 Dr. Spilotopoulos for both density and the
22 distribution co-efficient largely offset each
23 other and have a minimal or a negligible impact on
24 the final results."

25 Do you see that?

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1 A. Yes.

2 Q. Do you disagree with Dr. Konikow?

3 A. Yes.

4 Q. On what basis?

5 A. Because even though those two numbers
6 offset each other in the calculation of the
7 retardation factor, there were both used with
8 their erroneous values in the uncertainty analysis
9 and distributions of values for each one of those
10 that were considered in that analysis.

11 So the errors in those values actually
12 had an impact on the calculation of the
13 uncertainty range.

14 Q. You reviewed the uncertainty analysis to
15 check that?

16 A. Yes.

17 Q. Are you saying that for Tawara Terrace
18 and Hadnot Point?

19 A. This is for Tawara Terrace. That
20 statement here is for Tawara Terrace.

21 Q. All right. Dr. Konikow also says that
22 the retardation factor of 2.9, if you look toward
23 the middle of that page, he says, it is very
24 consistent with values in other fields -- field
25 studies reported in the literature, e.g. Rogers

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1 1992 and Krepp 2019 for aquifers. And this is
2 regarding aquifers having similar geologic
3 features.

4 Do you disagree with Dr. Konikow's
5 observation that 2.9 is a retardation factor
6 that's similar to aquifers having similar geologic
7 features?

8 A. I don't know that that statement -- what
9 exactly that means. Yes, it is possible. It's
10 also inconsistent with the value used right next
11 door, and especially the value here is based on no
12 site-specific data, but just model calibrations.
13 So there's a lot of discussion to be made about
14 this.

15 MS. BAUGHMAN: I'll object as
16 nonresponsive.

17 BY MS. BAUGHMAN:

18 Q. Did you look up any literature regarding
19 retardation factors?

20 A. I have been looked --

21 Q. I'm sorry. Let me ask it differently.

22 Did you look up literature regarding
23 retardation for aquifers having similar geologic
24 features?

25 A. I believe that the ones Dr. Konikow even

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1 mentions here are good. But again, the
2 calculation of retardation factors is something
3 that comes from site-specific data and model
4 calibration.

5 MS. BAUGHMAN: Object as nonresponsive
6 everything after "good."

7 BY MS. BAUGHMAN:

8 Q. Do you agree that the retardation
9 factors is and should be a transport parameter
10 that is tested and adjusted during calibration of
11 the model?

12 A. Of course.

13 Q. And the retardation factors, the
14 parameters that the transport model -- strike
15 that.

16 Do you agree that retardation factor is
17 the parameter in the transport model that is used
18 in the governing equation?

19 A. I'm sorry. Can you repeat that
20 question? I missed something there.

21 Q. Do you agree that the retardation factor
22 is the parameter in the transport model used in
23 the governing equation?

24 A. It is a parameter used in governing
25 equation, that's right.

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1 Q. Do you agree that the same value of
2 retardation factor can be attained with different
3 values of Kd and bulk density that are varied in a
4 balanced way?

5 A. Yes, provided that the values are
6 consistent with site-specific data conditions.

7 MS. BAUGHMAN: Object to nonresponsive,
8 everything after "yes."

9 BY MS. BAUGHMAN:

10 Q. Do you agree that an error in bulk
11 density value can and will be compensated by a
12 balancing error in the value of Kd and can still
13 yield the best fit to the data?

14 A. What do you mean best fit? I missed
15 that.

16 Q. I'll withdraw that one.

17 Do you agree with EPA and numerous other
18 authors that the fraction of organic carbon should
19 not be used to estimate Kd if the organic carbon
20 content is less than .001?

21 A. I believe Dr. Hannet would be most
22 appropriate to answer that question. But in
23 general, I would agree that there is consideration
24 that, yes.

25 Q. 43 percent of the Camp LeJeune samples

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1 tested for FOC, fraction of organic carbon, had
2 values less than .001; right?

3 A. I didn't do the math on the list, but
4 that's probably right.

5 Q. In your report at page 38 you opine
6 regarding what the model would have done if a
7 retardation factor 6.44 had been used.

8 What is the site-specific data basis to
9 choose a retardation factor of 6.44?

10 A. I'm not sure why this was misunderstood
11 in the rebuttals that I saw. What I said in my
12 statement there was that using the starting values
13 that ATSDR indicated that they selected for the
14 model calibration, the resulting retardation
15 factor would be 6. something based on the values
16 that ATSDR indicate in their report that they used
17 to start the calibration.

18 That's what I said. And the model
19 results based on that would be very different than
20 those that they ended up with during calibration.

21 Q. Are you saying that there is
22 site-specific data that supports the use of 6.44
23 as a retardation factor at Camp LeJeune?

24 A. I'm not opining on that. I just said
25 this is what ATSDR used. I have not done the

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1 calculation to see how we can come up with a value
2 like that based on the site-specific data.

3 I have not performed the calculation to
4 answer that question for you.

5 Q. So you can't identify any site-specific
6 data that would justify using a retardation factor
7 of 6.44, can you?

8 MR. ANWAR: Object to form.

9 THE WITNESS: No. I think it's possible
10 that using a starting value of the Kd based on the
11 range that we see and a value of the bulk density
12 and the porosity, it is possible to calculate a
13 number like that from site-specific data at Tawara
14 Terrace.

15 MS. BAUGHMAN: I'm going to object as
16 nonresponsive.

17 BY MS. BAUGHMAN:

18 Q. Did you use site-specific data to
19 calculate a retardation factor of 6.44?

20 A. I said that what I used was the starting
21 values. I indicated in my report that when ATSDR
22 started their model calibration, the starting
23 values they used for the parameter of Kd, bulk
24 density and porosity based on their reported
25 values, would end up with a retardation factor of

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1 6. something.

2 Q. Were those three numbers based on
3 site-specific data?

4 A. You mean that ATSDR considered?

5 Q. Starting values that you used for your
6 calculation, were those based on site-specific
7 data?

8 A. I'm not sure how to answer your question
9 better. I said these are the values that ATSDR
10 used.

11 MS. BAUGHMAN: I'm going to object as
12 nonresponsive and note for the record that you're
13 refusing to answer the question. I'm going to
14 move on because I don't have time for you to not
15 answer my question so many times.

16 MR. ANWAR: We disagree with that. But
17 let's move on.

18 BY MS. BAUGHMAN:

19 Q. If you turn to your report at page 52.

20 MR. ANWAR: What is time?

21 THE VIDEOGRAPHER: We will be at 6:30 in
22 four minutes.

23 BY MS. BAUGHMAN:

24 Q. So I want to talk about your criticism
25 the Tawara Terrace uncertainty analysis. And if

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1 you look at the bottom of page 52, the paragraph
2 that begins bottom of page 52, you wrote, "ATSDR
3 selected a range of acceptable values for key
4 parameters, such as Kd, for their uncertainty
5 analysis based solely on professional judgment and
6 literature sources."

7 Do you see that?

8 A. Yes.

9 Q. Selecting that range of acceptable
10 values based on professional judgment and
11 literature sources, is that a correct methodology?

12 MR. ANWAR: Object to form.

13 THE WITNESS: This is taken out of
14 context. If I say yes, it's fine. Yes, as a
15 starting point, that's fine, but there's a lot of
16 caveats to that.

17 BY MS. BAUGHMAN:

18 Q. What was the range of values for Kd used
19 by ATSDR for the Tawara Terrace uncertainty
20 analysis, do you know?

21 A. Do you want me to recall the exact
22 numbers that they used?

23 Q. I don't know if it's in your report. I
24 didn't see it. You're very critical of the range
25 they used. Can you tell me what the range was?

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1 A. I'm saying that -- well, one second.

2 Let me answer that properly.

3 They used a range of values based on
4 professional judgment. They did not look at
5 site-specific data and see how they should vary
6 that value. Had they considered such
7 site-specific data, they would have used a larger
8 range. But even the range that they said that
9 they considered was not fully explored because
10 they applied the statistics on how to calculate a
11 distribution around that value that narrowed that
12 range even more.

13 Q. Have you cited any support in the
14 literature for your criticism of the range of much
15 values used for the uncertainty analysis for
16 Tawara Terrace?

17 MR. ANWAR: Object to form.

18 THE WITNESS: I don't understand how I
19 should cite something for that, why I should cite
20 something for that.

21 BY MS. BAUGHMAN:

22 Q. Well, you have a very specific criticism
23 of how an uncertainty analysis was done for Tawara
24 Terrace based on the range of values that they
25 used.

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1 Is there any discussion of that in any
2 textbook or peer-reviewed study or ASTM method
3 that you can point to that supports your opinion
4 on how they should have selected the range of
5 values?

6 MR. ANWAR: Object to form.

7 THE WITNESS: The point that I'm making
8 is that they did not consider any site-specific
9 data. So their starting point is off. And that
10 they considered a tight range around it that
11 doesn't even consider higher values based on a
12 range they indicated as reasonable for that value.

13 That's all I'm suggesting. They
14 provided the range of reasonable values, and they
15 did not explore even that range. They explored a
16 subset of that range.

17 MS. BAUGHMAN: Objection.
18 Nonresponsive.

19 BY MS. BAUGHMAN:

20 Q. Can you cite any discussion in the
21 literature, textbooks, standards that supports
22 your criticism of how ATSDR did its uncertainty
23 analysis for Tawara Terrace?

24 MR. ANWAR: Object to form.

25 THE WITNESS: I have cited references

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1 with respect to how the uncertainty analysis is
2 supposed to be conducted, but it includes various
3 aspects of it. I'm not sure you want me to --

4 BY MS. BAUGHMAN:

5 Q. I want to know about this range issue.
6 Where is the citation for your criticism about
7 them not using the correct range of parameter
8 values? Where is that discussed in the literature
9 or the textbooks?

10 MR. ANWAR: Object to form.

11 THE WITNESS: I did not say that it was
12 an incorrect range. I said that they indicated a
13 reasonable range of values, and they only selected
14 a part of it. And given the value that they
15 started with, that was a very narrow range. They
16 didn't explore even the range that they consider
17 as reasonable for these soils.

18 BY MS. BAUGHMAN:

19 Q. Did you cite any peer-reviewed
20 literature in support of that criticism?

21 MR. ANWAR: Object to form.

22 BY MS. BAUGHMAN:

23 Q. Or a textbook or any kind of standard in
24 your field?

25 MR. ANWAR: Object to form.

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1 THE WITNESS: I can't think of something
2 that would support that because there would be a
3 literature source to answer your question.

4 BY MS. BAUGHMAN:

5 Q. I'm trying to understand the basis for
6 your opinions. You're not citing any literature
7 or a textbook or standard for the basis of your
8 criticism regarding how ATSDR did its uncertainty
9 analysis; right?

10 A. I think I explained very clearly what my
11 objections are with respect to how ATSDR selected
12 the range of values in their uncertainty analysis.

13 Q. Uncertainty analysis done for Tarawa
14 Terrace by ATSDR was done using Monte Carlo
15 simulations; right?

16 A. That is correct.

17 Q. And they used a probability density
18 function for the range of the parameter values;
19 right?

20 A. Correct.

21 Q. That is a recognized methodology in your
22 field to do an uncertainty analysis; correct?

23 A. I cannot answer your question with a
24 "yes" or "no." There are caveats to it. I have
25 to provide context.

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1 Q. You would agree that using the
2 probability density function for a Monte Carlo
3 simulation is a methodology that is accepted in
4 your field?

5 MR. ANWAR: Object to form.

6 THE WITNESS: That's only an element of
7 how we perform uncertainty analysis. There are
8 other considerations that are very important in
9 applying that.

10 BY MS. BAUGHMAN:

11 Q. And those other considerations that
12 you're relying on, you haven't cited any textbook
13 or standard or literature for those other
14 considerations that are so important to you;
15 right?

16 MR. ANWAR: Object to form.

17 THE WITNESS: I stated actually
18 reasoning for that that had to do with how the
19 model calibration is done, how the calibrated
20 model in this case is used as the truth in the
21 absence of data to test its accuracy. Therefore,
22 I have provided both reasoning and references with
23 respect to that.

24 BY MS. BAUGHMAN:

25 Q. References in the literature or

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1 textbooks or standards, publications? Where is
2 that reference?

3 A. I provided references for how the
4 uncertainty analysis is done, how it's supposed to
5 be done, and what are the deficiencies here with
6 respect to performing the uncertainty analysis.

7 Q. So if you turn to page 87 of your
8 report.

9 A. Just one second. Yes.

10 Q. At the bottom paragraph on page 87, you
11 wrote, "To understand the importance of this
12 assumption, recall that for the Tawara Terrace
13 uncertainty analysis, ATSDR defined reasonable
14 ranges for the calibrated parameter values."
15 Right?

16 A. Well, I'm making a distinction between
17 how the uncertainty analysis was done here versus
18 how it was done in Tawara Terrace. But the term
19 reasonable ranges here indicates that there was a
20 process for selecting these ranges in Tawara
21 Terrace, unlike Hadnot Point. I'm not qualifying
22 them as correct.

23 Q. So your opinion here is the ATSDR
24 parameter values for the uncertainty analysis were
25 reasonable; right? They had a reasonable range?

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1 MR. ANWAR: Object to form.

2 THE WITNESS: I'm just explaining the
3 context of my response here.

4 BY MS. BAUGHMAN:

5 Q. So now you're saying they're not
6 reasonable ranges?

7 MR. ANWAR: Object to form.

8 BY MS. BAUGHMAN:

9 Q. Are you taking this back?

10 A. I'm saying that the reasonable ranges
11 that were developed by ATSDR for Tawara Terrace
12 were based on mean values coming out of a
13 calibrated model that I don't believe was even
14 accurately calibrated. So there's a convoluted
15 process here.

16 I'm not sure I have that I have all the
17 words in there to describe that. But I'm
18 explaining to you exactly what I mean.

19 Q. You wrote, "ATSDR defined reasonable
20 ranges for the calibrated parameter values with
21 respect to the Tawara Terrace uncertainty
22 analysis."

23 That's what you wrote here; right?

24 A. And I'm explaining the context of that
25 to the extent that this is not transparent as to

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1 what the means.

2 Q. Do you agree that for the Tawara Terrace
3 uncertainty analysis, ATSDR defined reasonable
4 ranges for the calibrates parameter values?

5 MR. ANWAR: Object to form.

6 THE WITNESS: Again, I'm saying that the
7 reasonableness with respect to how that
8 distribution was defined mathematically, but I
9 don't think that the actual ranges were correct.
10 I'm just saying there was a method for developing
11 that unlike how it was done in Hadnot Point.

12 BY MS. BAUGHMAN:

13 Q. For Tawara Terrace, you criticized
14 ATSDR's uncertainty analysis because it did not
15 evaluate a wider range of the parameter values;
16 right?

17 A. I made the point that the values that
18 they selected through their model calibrations
19 were not necessarily correct. They were low in
20 the case of Kd. And even though they indicated
21 reasonable ranges, they explored only a tiny
22 portion of them just because they had no data to
23 calibrate the model properly and define a mean
24 value that would make sense.

25 MS. BAUGHMAN: Objection.

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1 Nonresponsive.

2 BY MS. BAUGHMAN:

3 Q. Turn to page 55 of your report. In the
4 second paragraph, you wrote, "ATSDR's uncertainty
5 analysis did not evaluate a wider range of
6 possible retardation factor."

7 Did I read that right?

8 A. Yes.

9 Q. So you're criticizing ATSDR on the one
10 hand for not evaluating a wider range of factors;
11 right? That's what you did here; correct?

12 A. I'm saying that it was not wider with
13 respect to the values that they considered at
14 Tawara Terrace.

15 Q. Then for Hadnot Point, you criticize
16 ATSDR because they used too wide of a range of
17 parameter values; right?

18 MR. ANWAR: Object to form.

19 BY MS. BAUGHMAN:

20 Q. It was extreme what you said; right?

21 A. It was unreasonable.

22 Q. Are your criticisms of ATSDR's
23 uncertainty analysis based on your professional
24 judgment?

25 A. Are you talking about the Tawara Terrace

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1 model or the Hadnot Point model?

2 Q. Both.

3 A. There are different reasons why I have
4 opinions against how it was done, but --

5 Q. Are you relying on your professional
6 judgment?

7 A. And I'm referencing literature sources
8 where a discussion is made about how the --

9 Q. Show me where the literature in your --
10 specifically where you're criticizing the
11 uncertainty analysis in your report, what's the
12 literature source for that?

13 A. I'm sorry. Which part of the criticism
14 that I provided?

15 Q. Where you're criticizing uncertainty
16 analysis, what's your literature source for that?

17 A. I believe -- let me just go and check.
18 One aspect is, for example, the value of that
19 prediction should --

20 Q. What -- I'm sorry?

21 A. Page 92.

22 Q. Tell me -- what I want is the citation
23 to a textbook or a standard in your field or a
24 published document. Is that what you're telling
25 me cited to?

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1 A. Yes, 294, yes.

2 Q. What page?

3 A. 92.

4 Q. So Doherty --

5 A. That's one that I can --

6 Q. Is this about the uncertainty analysis?

7 A. Yes.

8 Q. The page 52. Anything else?

9 A. And 35, that's Section 315.

10 Q. What page?

11 A. Page 8.

12 Q. What source are you relying on here?

13 A. Hill and Tiedeman talking about
14 precision accuracy of the model outputs when we're
15 looking at the uncertainty analysis.

16 Q. What about the sections of your report
17 where you discuss your criticisms of the
18 uncertainty analysis, did you cite any literature
19 or textbook there in support of your analysis or
20 your opinions?

21 A. I'm not sure I had to.

22 Q. Did you? Yes or no.

23 A. I don't think I did specific for some --

24 Q. Let's move on because I don't have much
25 time left.

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1 I want to talk to post-audits. Have you
2 done post-audits yourself before?

3 A. I'm assuming you mean looking using the
4 existing model to see how it fit data in the
5 future. Is that what you're referring or what is
6 the context?

7 Q. Just like it was done here by Norm Davis
8 and -- Norm Jones and Jeff Davis. That kind of
9 post audit, have you done those before?

10 A. I have done these.

11 Q. Have you done any post-audit for Camp
12 LeJeune?

13 A. No.

14 Q. On page 10 of your report, you had a
15 statement about post-audits and you say right at
16 the top of the page there, right above 3.1.7, you
17 say, "Post-audits may lead to updates in model
18 calibration using these new data to improve model
19 performance."

20 But that's not always the case, is it?

21 A. I'm sorry. Can you repeat the sentence
22 you're talking about?

23 Q. You wrote, "Post-audits may lead to
24 updates in model calibration using these new data
25 to improve model performance" on page 10.

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1 A. Yes.

2 Q. Do post-audits always lead to updates in
3 model calibration?

4 A. Not necessarily. It depends on data
5 available.

6 Q. You reviewed the post-audit Davis and
7 Jones; right?

8 A. Right.

9 Q. Were they missing pumping data that
10 should have been used in the post-audit? Are you
11 aware of any pumping data they were missing?

12 A. I'm not aware of any dataset like that.
13 I just saw what they had in their report. I
14 considered --

15 Q. The DOJ lawyers asked a lot of questions
16 of these experts about data that may have been
17 missing. So I'm asking: Are you aware of any
18 pumping data that was missing?

19 MR. ANWAR: Object to form.

20 THE WITNESS: I don't know.

21 BY MS. BAUGHMAN:

22 Q. I want to ask you about mean error. In
23 your report at page 60, you talk about mean error.
24 Actually you calculated mean error separately for
25 points where the observed data is higher and

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1 separately for points where the simulated value is
2 higher; right?

3 A. Yes. That's page 61, yes.

4 (Spiliotopoulos Exhibit 16 was marked.)

5 BY MS. BAUGHMAN:

6 Q. Turn to Konikow's rebuttal report,
7 Exhibit 16. On page 17, he discusses your method
8 of calculating mean error. And right above his
9 opinion -- this is an opinion to it -- right above
10 opinion 13, he said, "This is not a common or
11 standard way to compute mean error. Based on my
12 experience and expertise, the standard methodology
13 is to compute the mean error for all data."

14 Do you agree with Dr. Konikow?

15 A. I think there are different ways of
16 looking at the error in terms of how you try to
17 interrogate the model calculations.

18 Q. You didn't cite any textbook or
19 publication or standard in supportive your
20 methodology of computing mean error in your
21 report; right?

22 MR. ANWAR: Object to form.

23 THE WITNESS: My experience and
24 expertise.

25

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1 BY MS. BAUGHMAN:

2 Q. Did you cite any literature, any
3 standard, anything in support of your method?

4 A. No. Neither did Dr. Konikow.

5 Q. Also on page 60 of your report, in
6 paragraph 2, you stated in paragraph 2 on page 60,
7 "Observed concentrations of zero correspond to
8 nondetections."

9 Do you see that?

10 A. Yes.

11 Q. Wouldn't you agree that nondetect values
12 do not necessarily have a value of zero? Their
13 value can be anywhere below the detection level;
14 right?

15 A. I have to go back to their report
16 because I believe that they show zeros as
17 nondetections in their expert report. That's my
18 recollection. I'm just using the data in their
19 table to show them in this graph.

20 Q. Let me ask you this: You agree that
21 assuming that a nondetect can be substituted by a
22 value of .1 micrograms per liter is arbitrary;
23 right?

24 MR. ANWAR: Object to form.

25 THE WITNESS: It's a way of putting the

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1 data in the plot instead of completely excluding
2 them because they're nondetects.

3 BY MS. BAUGHMAN:

4 Q. You could also put the issue in the plot
5 by using half the value of the detection limit;
6 right?

7 A. Theoretically, yes. There are different
8 ways of showing them.

9 Q. Are you aware of any literature
10 indicating that what you did is an acceptable or
11 standard practice of assuming a nondetect is .1 as
12 opposed to half of the detection limit?

13 MR. ANWAR: Object to form.

14 THE WITNESS: I'm not sure I can answer
15 your question like that. All I did here was to
16 use the data and put them in the plot because they
17 were not shown before. So whether it's half the
18 detection limit, .1 or something, in the report of
19 Jones and Davis, those data were not plotted
20 anywhere.

21 BY MS. BAUGHMAN:

22 Q. If a detection limit is 10 micrograms
23 per liter, you agree with me it's possible the
24 actual value could be five or nine or one
25 micrograms per liter rather than zero; right?

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1 A. I don't know. It depends on the data.
2 You have look at them very carefully. There are
3 ways of evaluating that.

4 Q. Just to go back an issue we talked about
5 earlier regarding retardation factor and bulk
6 density and distribution co-efficient, that
7 subject, would you agree that only the retardation
8 factor is used in the contaminant fate and
9 transport equation?

10 A. The way it's formulated in MT3D, that is
11 correct.

12 MS. BAUGHMAN: I'll pass the witness.

13 MR. ANWAR: Sure.

14 EXAMINATION

15 BY MR. ANWAR:

16 Q. Good evening, Dr. Spilotopoulos. I know
17 it's been a long day. Thanks for your time. I
18 just had a few questions I wanted to follow up on.
19 Bear with me. I'm going to try to make this as
20 quick as possible.

21 During the course of Ms. Baughman's
22 examination, you were asked a number of questions
23 about what data ATSDR did and didn't consider.

24 Do you recall that questioning?

25 A. Yes.

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1 Q. How much sampling data did ATSDR have to
2 consider in their models?

3 MS. BAUGHMAN: Objection to the form.

4 THE WITNESS: The large number of data
5 listed in those tables, essentially only a handful
6 were used because those were groundwater samples
7 to be used for model calibrations.

8 BY MS. BAUGHMAN:

9 Q. What was the timeframe for that handful
10 of concentration level sampling data?

11 A. With respect to water supply wells for
12 Tawara Terrace, I think they were somewhere
13 between end of December '84, beginning of '85,
14 maybe a couple months into '85 after the wells
15 were turned off and a set of measurements in 1991
16 I believe for Hadnot Point, there were the
17 measurements again around like the end of '84,
18 beginning of '85 at the extraction wells, a few
19 values after that.

20 And then there was also a dataset from
21 the remediation phase I believe at two wells
22 downgradient of well HB-651 in the landfill, so in
23 an area outside the industrial area, for example,
24 where the focus of the calculations was or even
25 near well 651.

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1 Q. When I say sampling data, I'm referring
2 to contaminant concentration level data.

3 Do you understand that?

4 A. Yes. That's what I'm referring to.
5 When I'm answering your question, I'm talking
6 about the sampling data, concentration data that
7 were used in the model calibrations process.

8 Q. Why is sampling data or concentration
9 level data important for evaluating the accuracy
10 of a groundwater model for a fate and transport
11 model?

12 A. In the absence of data, there's no way
13 of testing the accuracy of the model. And then
14 depending on the number of datapoints you have and
15 how spread out they are, within period of
16 interest, you can build confidence into the model
17 accuracy because important things like arrival of
18 contaminants or the variability of concentrations
19 in the aquifer over time can be somewhat tested
20 rather than assumed based on general assumptions
21 for parameters or operation of the system.

22 Q. Throughout your report, you were asked
23 about it today, you referenced the limited data or
24 the lack of data.

25 Do you recall that?

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1 A. Yes. I mentioned the lack of
2 site-specific data and the lack of sampling data
3 for model calibrations.

4 Q. You anticipated my question. Much of
5 the discussion was focused on certain
6 site-specific data that was and wasn't considered.

7 But when you're referring to the lack of
8 data in your report, are you also referring to
9 sampling data?

10 MS. BAUGHMAN: Objection. Leading.
11 Object to form.

12 THE WITNESS: I'm considering both, the
13 data that go into constructing the model,
14 site-specific data, operational data, and then I'm
15 also look at the sampling data that were used for
16 model calibrations if we're talking about the fate
17 and transport model.

18 BY MR. ANWAR:

19 Q. Now, you were asked a number of
20 questions today about references that you
21 considered. Do you recall that discussion?

22 A. Yes.

23 Q. Could you turn to page 94 of your
24 report, Exhibit 4?

25 A. Yes.

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1 Q. What is starting on page 94 -- strike
2 that.

3 Is page 94 entitled References?

4 A. Yes.

5 Q. Is this the list of references you
6 considered in forming your expert opinions in your
7 report?

8 A. You mean the list from page 94 onward
9 and through 100?

10 Q. Yes.

11 A. Yes.

12 Q. I wanted to direct your attention to a
13 couple of references. If you go to page 98, at
14 the bottom of page 98, there is a reference by
15 Doherty.

16 Do you see that there?

17 A. Yes.

18 Q. Is this a reference you considered in
19 offering opinions about the uncertainty analysis
20 performed in ATSDR's model?

21 MS. BAUGHMAN: Objection. Leading.
22 Objection to the form.

23 THE WITNESS: It is a reference that I
24 used in my report, and I considered many points in
25 that reference.

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1 BY MR. ANWAR:

2 Q. If you turn to page 100, there's another
3 reference in the middle of the page, Sepúlveda and
4 Doherty. Do you see that?

5 A. That's another -- yes. That's another
6 reference on the uncertainty analysis, yes.

7 Q. Did you consider that in forming your
8 expert witness in this case?

9 MS. BAUGHMAN: Objection. Leading.
10 Objection to the form.

11 THE WITNESS: It is referenced in my
12 report. I don't know if it was -- probably more
13 than one point, yes.

14 BY MR. ANWAR:

15 Q. Could you turn back to page 98. You
16 were asked some questions earlier in the
17 deposition about the Woburn study. Do you recall
18 that?

19 A. Yes.

20 Q. If you turn to or if you look near the
21 bottom of the page with the author -- by the
22 authority starting Costas, do you see that?

23 A. Yes.

24 Q. Is that a reference you considered in
25 regard to the Woburn study?

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1 MS. BAUGHMAN: Objection. Leading.

2 Object to the form.

3 THE WITNESS: Yes, in fact. Yes, yes,
4 yes.

5 BY MR. ANWAR:

6 Q. And then if you turn to page 99, near
7 the bottom of the page, there is a reference
8 starting with the author name, last name Lagakos.
9 Do you see that?

10 A. Yes.

11 Q. Did you consider that reference as well?

12 A. I looked at it as well.

13 MS. BAUGHMAN: Objection. Leading.

14 BY MR. ANWAR:

15 Q. Does this reference relate to the Woburn
16 study that you were discussing earlier in your
17 deposition?

18 A. Yes.

19 Q. Now, earlier in your deposition, you
20 were asked a number of questions about what
21 organizations you do and you don't belong to. Do
22 you recall that?

23 A. Yes.

24 Q. Your professional organizations. Do you
25 recall that?

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1 A. Yes.

2 Q. Now, looking at your CV, Exhibit 1.

3 A. Okay.

4 Q. And you discussed this with Ms. Baughman
5 during her examination. But to the right-hand
6 side, you have Example Areas of Expertise; is that
7 right?

8 A. Correct.

9 Q. And the example areas of expertise there
10 are groundwater remedy design and evaluation,
11 water resource evaluation and management,
12 environmental data analysis, and groundwater
13 modeling.

14 Do you consider yourself an expert in
15 all of these fields or areas?

16 A. Yes.

17 Q. What is that expertise based on?

18 A. My education, training, more than 20
19 years of professional experience in the field
20 working on a variety of projects with extremely
21 qualified colleagues as part of the firm that I
22 work for, in collaboration with other experts in
23 the field as part of the different project work
24 where collaboration was involved.

25 Q. Tell me a little bit about your

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1 education. Do you have a Ph.D.?

2 A. Yes. I have a Ph.D. in the optimization
3 of groundwater management systems. That involves
4 both the evaluation of environmental data and
5 groundwater modeling and numerical method and
6 approaches for designing groundwater remediation
7 systems or other types of groundwater management
8 systems in an optimal way. So that involves
9 advanced mathematics and coding.

10 Q. Do you know, does Mr. Maslia have a
11 Ph.D.?

12 A. I don't think so, but I'm not sure. I
13 don't think so.

14 Q. Now, you mentioned your 20 years of
15 experience working in the field. Can you describe
16 that to me a bit more?

17 MS. BAUGHMAN: Objection. Form.

18 THE WITNESS: I have worked in a wide
19 variety of projects involved in groundwater
20 remediation for different contaminants of concern,
21 a wide variety of radio nucleides to volatiles,
22 metals. I have worked in different projects, many
23 of them very high profile. I would consider
24 Hanford one of the most high profile ones. I
25 provided work there for over 15 years.

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1 I was the technical lead for all the
2 system performance evaluations, delineation of
3 contaminant plumes, evaluation of environmental
4 data there, including statistics and other methods
5 to determine or evaluate the progress of
6 remediation or design of monitoring systems,
7 designing of various tests, collaborated with
8 Pacific Northwest National Lab and a lot of that
9 work there.

10 I have done work in the litigation field
11 with respect to interstate dispute resolution,
12 usually involving groundwater management issues,
13 the use of groundwater for irrigation and other
14 similar topics for generally disputes between
15 states. And I have supported expert work
16 conducted by other experts, well recognized
17 experts in our field working for S.S. Papadopoulos
18 & Associates various labels.

19 I've also been involved in a very high
20 profile yet confidential -- unfortunately for me
21 because it hasn't been published -- on a very
22 challenging work in modeling groundwater flow in
23 fractured rock.

24 These are the things that come off my
25 head, including other work that was done before I

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1 came back to the United States from Greece.

2 BY MR. ANWAR:

3 Q. During the course of your 20 years
4 working -- 20 plus years working in the field,
5 have you built and evaluated groundwater models?

6 A. Routinely.

7 Q. Does that include building or evaluating
8 groundwater flow models?

9 A. Yes. Just to make sure, both building
10 and evaluating because as part of the work that
11 S.S. Papadopoulos does is we come in the picture
12 when difficult technical problems come up. And
13 our services are requested to provide expertise
14 and in forming opinions or helping out with a
15 solution.

16 Q. During the course of your 20 plus years
17 in the field, have you built and/or evaluated fate
18 and transport models?

19 A. Also routinely, yes.

20 Q. What about water distribution models?

21 A. I've worked on water distribution models
22 as part of my work as a civil engineer when I was
23 in Greece for a period of three years. I have
24 formal education on that subject as well. And at
25 the time I worked on updating the water main

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1 distribution network of the City of Athens, so a
2 pretty large one.

3 Q. Are your opinions in your expert report
4 and that you're offering in this case based on
5 your education and over 20 years of experience
6 working in the field?

7 MS. BAUGHMAN: Objection. Leading.
8 Object to the form.

9 THE WITNESS: The opinions that I
10 provided were based on my experience and expertise
11 from over 20 years working on projects or problems
12 like that.

13 BY MR. ANWAR:

14 Q. And as part of your education and
15 working in the field over the course of 20 years,
16 have you referred to or reviewed literature
17 sources during the course of your work?

18 MS. BAUGHMAN: Objection. Form.

19 THE WITNESS: Can you clarify the
20 question? You mean --

21 BY MR. ANWAR:

22 Q. Have you kept abreast of the
23 developments in groundwater modeling during the
24 course of your 20 years working in the field?

25 MS. BAUGHMAN: Objection. Form. And

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ALEXANDROS SPILIOTOPOULOS, PH.D.

1 object to leading.

2 THE WITNESS: As part of my work at
3 SSPA, I have participated in conferences to stay
4 abreast with developments in our field. I have
5 collaborated with experts in developing codes and
6 computational tools.

7 I have participated in the development
8 of these tools in relation to MODFLOW, for
9 example, myself on different occasions. And I've
10 also been lucky to be working with other experts
11 that have -- perform similar work and provided
12 similar contribution. So this is where both
13 mentoring in my early years, but also continuing
14 learning experience at my company has occurred
15 over these years.

16 BY MR. ANWAR:

17 Q. Thank you. Those are all the questions
18 I have.

19 MS. BAUGHMAN: We're finished.

20 THE VIDEOGRAPHER: Off the record at
21 1836.

22 (Whereupon, at 6:36 p.m., the taking of
23 the instant deposition ceased.)

24

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ALEXANDROS SPILIOTOPOULOS, PH.D.

1 COMMONWEALTH OF PENNSYLVANIA)

2 COUNTY OF ALLEGHENY) SS:

3 C E R T I F I C A T E

4 I, Ann Medis, RPR, CLR, CSR-WA and
5 Notary Public within and for the Commonwealth of
6 Pennsylvania, do hereby certify:

7 That ALEXANDROS SPILIOTOPOULOS, PH.D,
8 the witness whose deposition is hereinbefore set
9 forth, was duly sworn by me and that such
10 deposition is a true record of the testimony given
11 by such witness.

12 I further certify the inspection,
13 reading and signing of said deposition were not
14 waived by counsel for the respective parties and
15 by the witness.

16 I further certify that I am not related
17 to any of the parties to this action by blood or
18 marriage and that I am in no way interested in the
19 outcome of this matter.

20 IN WITNESS WHEREOF, I have hereunto set
21 my hand this 19th day of March, 2025.

22

23

24

Notary Public

25

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ALEXANDROS SPILIOTOPOULOS, PH.D.

1 COMMONWEALTH OF PENNSYLVANIA) E R R A T A
2 COUNTY OF ALLEGHENY) S H E E T

3 I, ALEXANDROS SPILIOTOPOULOS, PH.D, have read the
4 foregoing pages of my deposition given on
5 March 18, 2025, and wish to make the following, if
any, amendments, additions, deletions or
corrections:

6	Page	Line	Change and reason for change:
7			
8			
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19 In all other respects, the transcript is true and
20 correct.

21
22 ALEXANDROS SPILIOTOPOULOS, PH.D

23 _____ day of _____, 2025.

24 _____
25 Notary Public

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ALEXANDROS SPILIOTOPOULOS, PH.D.

GOLKOW, a Veritext Division
One Liberty Place
1650 Market Street, Suite 5150
Philadelphia, Pennsylvania 19103
877.370.3377

March 19, 2025

Haroon Anwar, Esquire
U.S. Department of Justice
1100 L Street NW
Washington, DC 20005

Re: Deposition of ALEXANDROS SPILIOTOPOULOS, PH.D
Notice of Non-Waiver of Signature

Dear Mr. Anwar:

Please have the deponent read his deposition transcript. All corrections are to be noted on the Errata Sheet.

Upon completion of the above, the Deponent must affix his signature on the Errata Sheet, and it is to then be notarized.

Please forward the signed original of the Errata Sheet to Laura J. Baughman, Esquire for attachment to the original transcript, which is in her possession. Send a copy of same to all counsel.

Please return the completed Errata Sheet within 30 days of receipt hereof.

Sincerely,

Ann Medis, RPR, CLR, CSR-WA

cc:

Laura J. Baughman, Esquire

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